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FROM THE TEST CENTER

 Portable
Computers

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486 Group Plans To Battle Vendor 'Lawlessness'

By ALICE LAPLANTE

NEW YORK — A posse of powerful PC professionals will ride into Comdex to fight against what they see as standards "lawlessness" in the industry.

Called the 486 Standards Committee, this user coalition was formed under the auspices of the New York-based Microcomputer Managers Association and is open to any corporate PC buyer who influences the purchase of more than \$1 million annually.

The first public meeting will be held at Comdex on November 15 at 4:45 p.m. in Room M2-4 of the Las Vegas Convention Hall.



"The 486 generation of PCs is only a year away, and we need to discourage manufacturers from coming up with proprietary hardware specifications in order to create what they consider an edge in the marketplace," said Brian Livingston, chairman of the committee.

As samples of Intel's 80486 chip begin to ship to selected vendors and design engineers, PC professionals are increasingly concerned that standards and compatibility will be ignored in the frantic race to provide more features and more innovative technology, Livingston said.

See 486, Page 85

EISA Vendors to Implement Proprietary Memory Buses

By ROBERT SNOWDON JONES

Industry players committed to the Extended Industry Standard Architecture (EISA) bus — most notably Compaq Computer Corp. and AST Research Inc. — say they plan to implement proprietary memory buses in their EISA machines.

The move should make it possible for EISA machine vendors to make performance improvements, but it undermines the market for standardized EISA memory expansion boards and may threaten price competition for those add-ons, warned

providers of add-on boards.

Compaq and AST officials said using a memory bus separate from the I/O bus will make it easier for engineers to take advantage of improvements in microprocessors. As CPUs get faster, they are beginning to see the peripheral bus — even a 32-bit one — as a hindrance to performance. The slowdown occurs when the bus cannot keep up with handling I/O chores for CPUs that manage data at 16 megabytes per second or more.

Compaq and AST, both of which use concurrent memory

See EISA, Page 8

■ NEW THIS WEEK

With this issue, *InfoWorld* introduces Perspectives, a weekly section designed to explore issues of significance to our readers. The section will include a combination of feature-length articles and analysis and opinion pieces — all designed to put new trends, important issues, and key product categories into focus.

Also new this issue is the Impressions section, in which *InfoWorld* staff will discuss new and unreleased products.

OS/2 1.1 Meets Shipping Deadline

Publishers to Demonstrate Products Using Presentation Manager

By RACHEL PARKER
AND ED SCANNELL

NEW YORK — Defying skeptics who predicted Presentation Manager would be late, IBM and Microsoft today will announce that OS/2 1.1 with the graphical interface is shipping.

Since Presentation Manager was announced 18 months ago, industry observers have suspected that IBM and Microsoft would not be able to meet their planned ship date of October for the product.

Speaking last week at the Executive Forum, in Cambridge, Massachusetts, IBM senior vice president and general manager George H. Conrades said the graphical user interface for OS/2 will ship on time.

A wide variety of software publishers are expected to join IBM and Microsoft at today's event here, including Aldus, Ashton-Tate, Lotus, Micrografx, Microrim, and Software Publishing.

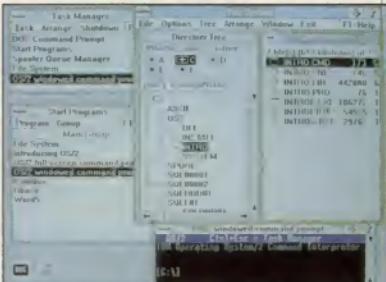
■ FIRST LOOK

Presentation Manager Offers Surprises

By MICHAEL J. MILLER

Microsoft and IBM have some surprises for users with the OS/2 Presentation Manager, scheduled to be released today. Not only is the operating environment out on schedule, but the end-user version includes extras like computer-based training, a nice help system, and some unique innovations in its file manager.

Although it won't reach its potential until we start seeing



Presentation Manager offers a tree-structure file system, and OS/2 applications can be run within windows on the main screen.

PRESENTATION MANAGER PRODUCTS. A few publishers also are expected to demonstrate Presentation Manager products.

For example, Xcelerent Inc. of Atlanta will show a graphics-

based system that uses Presentation Manager to streamline wide area network management.

Session setup is handled through a card-stack metaphor

See PM, Page 85

When you boot with OS/2 1.1, you see a graphic-based interface, controlled by two main windows. The Task Manager lists active programs and lets you switch among them. A Start Programs window lists all the applications you have installed and lets you access the DOS command line or an OS/2 command line, either full screen or within a window. Additional OS/2 programs can be installed in particular groups, so you

See Look, Page 85

AT DEADLINE

Some OS/2 Applications Delayed

IBM senior vice president and general manager George H. Conrades announced late last week that IBM had sharply modified its expectations for the availability of OS/2 applications.

Although IBM had previously promised 1,000 OS/2 applications by the end of 1988, Conrades now maintains there will only be 600 such applications by the end of the year. In addition, Conrades said that most of those 600 OS/2-compatible applications will be DOS applications

running in OS/2's "compatibility box."

Conrades also admitted, as other senior IBM executives have done recently, that OS/2 hasn't "taken off" as planned, but he added that all major software developers are writing "SAA applications" — IBM's term for applications written for OS/2 Extended Edition — that will be out by the middle of 1989.

— Ed Scannell

Continued on Page 3

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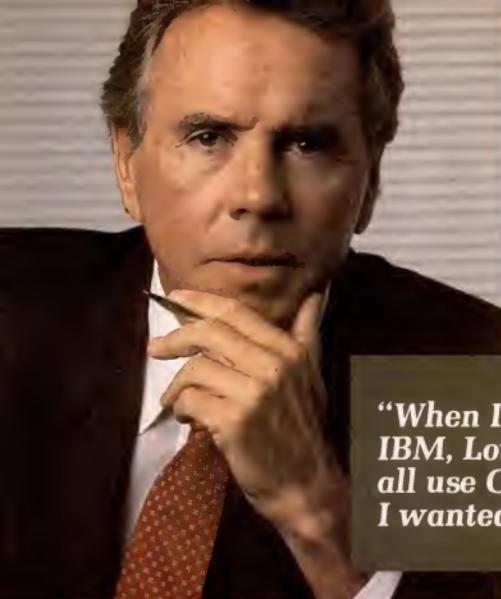


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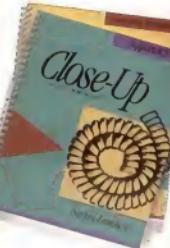
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Corporate Communications

NEWS

Several Innovations Won't Make Comdex

Improvements and Upgrades Will Abound

BY RACHEL PARKER

In a year characterized by promises of a revolution in computing, fall Comdex attendees are likely to see few products that reflect that revolution on the show floor.

That's the conclusion of dealers and consultants preparing for fall Comdex, which opens November 14. Although the show will be even larger than last year's record-breaking show, vendors are not ready to show many of the products that have captured headlines this year, including the Next machine, Micro Channel clones, and "next-generation" OS/2 applications.

"We will see a lot of stuff, but not anything revolutionary," said Seymour Merrin, president of Merrin Resources. "There will be lots of upgrades and odds and ends," he added.

"The time for revolutions is gone," said Enzo Torrisi, vice chairman of Businessland. "There may be some revolutions when the power of these platforms comes together with operating systems, but that is some time late next year."

Perhaps the most revolutionary announcement for the year — Steve Jobs' Next computer — will not be seen on the show floor. Although the company exhibited at the Educom conference last week, it has not reserved booth space for the more dealer-oriented Comdex.

Other hardware vendors are working on improvements to their current AT and 80386 systems, as well as supporting the 80386 SX chip.

"We're going to see a plethora of 386 SX machines," said Larry Fortmiller, director of systems marketing at AST Re-

search. "I expect an awful lot of companies will be looking at [the 386 SX] as a bridge between AT and the 80386 systems."

And although the technical issues have been addressed, most observers doubt that many hardware vendors will announce Micro Channel compatibles.

"There may be some Micro Channel clones, but not in significant numbers," said Alan Hald, chairman of Micro Age Computer Stores. Like many other dealers, Micro Age franchisees see no demand for Micro Channel compatibles, he added.

The Gang of Nine vendors will also disappoint anyone looking for a glimpse of future systems. With the Extended Industry Standard Architecture (EISA) specification nearing completion in October, vendors are not able to even show prototypes of EISA-based systems.

Still, the Gang of Nine — and especially Compaq — will likely discuss EISA systems and how they will differ from existing 80386-based systems. "Compaq and the Gang of Nine need to position where these machines will fit," said David Carnevale, a PC analyst with Infocorp. They also need to reaffirm their on-going commitment to AT-bus systems for individual users, he said.

Software vendors are also trying to straddle a fence by continuing to support and enhance existing packages while making strong commitments to OS/2. While IBM and Microsoft will host an OS/2 forum at the show, most vendors and observers doubt the OS/2 applications shown at fall Comdex will take full advantage of the operating system or prompt users to switch to the new system.

Dbase IV Ships but Is Incompatible With Some Programs

BY MARK BROWNSTEIN

AND PEGGY WATT

Ashton-Tate, saying it is hoping for a last-minute change in quarterly revenues, hustled out the first copies of Dbase IV, Version 1.0 last week and was met with complaints that the product is incompatible with some earlier applications.

Applications that are developed under Dbase III Plus and compiled with a third-party vendor's compiler, or that otherwise do not strictly follow Dbase III Plus conventions, may not run when automatically recompiled under Dbase IV, according to an Ashton-Tate spokesman.

The Dbase III Plus interpreter ignores some code flaws, but the code probably fails under Dbase IV's more "automatic optimizer," which is more prone to execute code, the spokesman said. However, Dbase III Plus source code will run unmodified with Dbase IV.

First reports of the problem came from the United Kingdom, where Dbase IV shipments arrived last week. PC World, a sister publication of InfoWorld, reported Dbase III Plus applications from Computercraft Ltd. of London crashed under Dbase IV.

Ashton-Tate said it plans to



SOURCE: THE WOHL REPORT

The fluctuating costs of key components, including DRAM chips, have kept PC prices high.

Some PC Price Cuts Fail to Reach Users

BY ALICE LAPLANTE

Over the last six months, many leading PC vendors have slashed system prices, but analysts point out that these price cuts have often not been reflected in the actual price end-users pay.

This has been a year heavy with price fluctuations as well as rumors of price decreases that haven't panned out. And while there is plenty of evidence to support the prevailing wisdom that price/performance in the PC industry continue to rise steadily, there is also evidence to prove that wisdom false.

Research for Wohl Associates of Bala Cynwyd, Pennsylvania, which tracks "street prices" of PC hardware, shows that after a dramatic drop in street prices in

the closing months of 1987, prices first remained on a plateau but then increased slightly. The Wohl Report compares similarly configured systems, so that any change in system configuration is taken into account.

Reasons for this are varied, analysts say. For one, the fluctuating cost of key components has made it difficult for vendors to keep prices low. "I've talked to a number of vendors who say they absorbed most of the added expense of the DRAM, and they can only go so far in doing that," said JoAnne Stahel, vice president of research at Storeboard Inc., in Dallas.

But a less obvious reason, which explains why vendors can lower retail prices while street prices remain stable or even increase, is dealers — who have been discounting PCs as much as 30 to 40 percent — simply hold prices even when retail prices drop.

A number of manufacturers announced price cuts on 80286-based machines in recent months. Compaq attacked the list in June. When it announced several new machines, it also cut the retail price of its Deskpro 286 by 15 percent.

In late June both NCR and Hewlett-Packard followed suit by announcing price cuts on 286 and 386 machines by as much as 18 percent. And in August, Wang started offering its key corporate accounts fully loaded 386 systems for under \$4,000, a 60 percent off retail prices.

But a look at the Wohl index of actual end-user street prices shows that leading 286s (from

EPSON, AST, NEC, Compaq, and IBM) have all increased in the past three months. And in the 386 arena, most street prices have remained flat over the past seven months, with IBM offering dramatically increasing in end-user cost.

But Apple shocked the industry most with its mid-September skyrocket price increases, ranging from 14 to 30 percent. The list price of the base Mac II rose from \$3,769 to \$4,869.

IBM has sent very mixed signals about its pricing strategy. In February, IBM's Bill Lowe announced IBM would be offering increased price/performance across its entire PS/2 line.

But when price cuts did finally arrive, they were moderate. In the June 7 introduction of the Model 70 and improved Model 50, IBM offered only slight discounts on certain PS/2s, with the original Models 30 and 50 not discounted at all.

In the form of the enhanced Model 30 built around a 286 processor and retailing for under \$2,000, which was announced in mid-July, IBM's Lowe statements were partially confirmed. However, his prediction that customers would be able to buy (at the end of 1988) 286 systems at the same price as the current 8086-based Model 30 has yet to be fulfilled.

There is evidence of future price increases, and from unlikely sources. For example, Key Tronic Corp., which provides keyboards for many OEMs, last month announced price hikes of 8 to 15 percent — the first such increase in its history.

IBM Refrains From Backing HP's SAA-Compliant Interface

BY BOB PONTING

In an unusual twist, IBM said last week it doesn't plan to support the SAA-compliant user interface for Unix that Hewlett-Packard is expected to unveil this week at the Uniform show.

The interface, which is dubbed the Common X Interface (CXI), was developed by HP and Microsoft and will provide HP's Unix systems with the look and feel of the Presentation Manager, said Nicholas Fowler, HP's marketing manager.

For user interfaces, CXI will run on top of the X Window windowing manager and uses the X Window API (Applications Programmers Interface), he said.

However, IBM, SAA's developer, has decided against endorsing the interface at this time. "We will not take Presentation Manager and force it on Unix customers just because we think it's wonderful and SAA portability would be nice," said Dan Cerutti, IBM's AIX product manager. "If OSF goes with Open Look or something else, we don't want to be left out in the

cold," he said.

Until the industry settles on a standard interface, IBM will offer two options — NeXTstep from Steve Jobs' Next Inc. and whatever interface OSF decides to use, Cerutti said.

In the meantime, HP and Microsoft will be pushing for CXI's acceptance as the OSF standard. CXI is part of a phased strategy for porting the Presentation Manager user interface and applications programmers interface from OS/2 to Unix, said HP's Fowler. A common user

interface would hide differences between the two systems from users.

CXI provides Unix with only the look and feel of Presentation Manager, Fowler said. While CXI is functionally identical to Presentation Manager, it will look somewhat different from the OS/2 version. HP has added perspective and shadow to buttons, windows, menus and scroll bars, giving the screen a three-dimensional look, he said.

The interface will be available to OEMs, VARs, and developers in three pieces. Fowler said. HP and Microsoft have jointly developed a Presentation Manager style guide for writing applications. A CXI programmer's toolkit, developed by HP, provides a library of routines for creating and manipulating objects like scroll bars, buttons, and menus. A Windows Manager, developed with the toolkit, manages the screen's real estate, files, and icons, he said.

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Lotus Slapped With Class Action Lawsuit Over 1-2-3 Holdups

BY ED SCANNELL

BOSTON — A class action lawsuit was filed last week against Lotus Development Corp., claiming that the company purposely misled stockholders about when it would deliver Lotus 1-2-3, Release 3.0.

The suit, filed in federal district court here, charges the company, president Jim Manzi, and board member Alexander d'Arbeloff with disseminating "false and misleading information," regarding delivery of Release 3.0. (D'Arbeloff is also the president of Teradyne.)

The suit also charges the defendants' statements tried to soften the adverse impact on company revenues of the two shipment delays. The company's stock price has dropped from \$33 in March to 17½ last Thursday.

The suit asserts that several Lotus executives, including Manzi, sold stock in February when the stock was close to its peak, a few weeks before the company announced the first delay of Release 3.0. Manzi sold 250,000 shares priced between \$27.50 and \$28 on February 22. Manzi has said he sold the stock to pay income taxes.

The suit is brought by shareholder Matthew Berliner on behalf of all those who purchased Lotus stock between February 25 and October 7. So far, however, no other plaintiffs have been named. Berliner claims that he lost \$3,000 because of Lotus' misleading statements.

"Our view is that the claims are entirely without merit and we will vigorously defend ourselves," said Henry Gutman, an attorney with the New York-based law firm of O'Sullivan, Graev and Karabell, which is defending the company.

Lotus had a similar suit filed against it in mid-1985 when a shareholder claimed that Lotus wasn't being forthcoming about sales of Jazz and technical problems with Symphony. Lotus won that suit when the judge ruled the complaint was not representative of the class named in the suit.

No date has yet been set for preliminary hearings.



Formbase is a Windows-based forms designer that lets users create color forms with drawing tools, multiple fonts, and graphics.

Xerox to Show Integrated Form Designer at Comdex

BY BOB PONTING

For the newest entry in its desktop software portfolio, Xerox will introduce an integrated forms processor and database manager at fall Comdex.

The new product, Formbase, is a Microsoft Windows-based WYSIWYG forms designer intended to complement Xerox's Ventura Publisher desktop publishing package and the Xerox Presentations graphics package.

As users design a form, Formbase automatically creates and manages the database underneath it, said Frank Mahdavi, president of Columbia Software of Northridge, California, developer of the product.

Forms are the only interface to the database, so users can set mailing lists, inventory control, and other applications without programming. Users can also

define field computations and data-entry validation.

Windows graphics tools are used to design forms and data-entry screens. Users can modify a form and its underlying database at any time, Mahdavi said. To link fields among forms, users cut and paste parts of one form into another.

Formbase can directly import ASCII data and files from several common applications and imports graphics through the Windows clipboard. The program includes a text editor that can be used for mail-merge applications and a script facility to automate repetitive tasks.

Xerox has all marketing rights for Formbase and plans to ship the product in the first quarter, bundling it with the Windows run-time system and Bitstream Fontware. Prices will be announced at shipping time.

the 80486 will go up by two or more times what it is now. We don't want to tie it down to the 16 bus."

WITHERING DEMAND. Board makers are already preparing for a withering demand for stand-alone memory boards. Instead of memory boards, the companies will concentrate on making intelligent peripherals that contain their own memory and operate independently from the CPU.

"We don't see plain add-in memory cards as a real big opportunity on the EISA bus," said Tim Cutler, director of product marketing for Quadram Corp. "Eventually you'll see [CPU/memory] disappear from the I/O bus."

It is likely the EISA bus will be relegated to the chores of input and output for disk drive, modem, LAN connections, printers, and graphics — tasks it will be able to handle with ease.

PLUG-IN DRAM SIMMs. Expanding memory on these high-performance computers will be differ-

Colby to Sell SE Model of Walk-Mac

Plans for Authorized Apple Dealers to Install Spare Motherboards

BY LAURIE FLYNN

FRESNO, CA — Taking an innovative approach to the Mac portable market, Colby Systems Corp. plans to sell unfinished SE compatibles to authorized dealers who will then complete construction of the systems by installing spare Mac SE motherboards into them.

In December, the company will begin selling the Walk-Mac SE, which weighs only 12 pounds and uses a form factor that includes a built-in keyboard and internal battery option. To configure the units, dealers will draw from their own stock of Mac SE motherboards, generally used for servicing their customers, according to company president Charles Colby.

The Walk-Mac SE's screen is a double-super-twist blue-backlit LCD, and its keyboard includes a numeric pad and function

keys. The list price of the Walk-Mac SE is \$5,499.

Options include the Epson Smartcard, a credit-card-size static-RAM card with an optional battery. In January, Colby will offer an optional flat-panel display that users can attach to overhead projectors.

The Walk-Mac SE, which resembles a standard DOS laptop in design and measures 12 inches by 15 inches by 3½ inches, will replace all of Colby's earlier portable models, which will be discontinued.

Colby is one of only two vendors selling a portable Macintosh. Dynamac of Golden, Colorado, announced in August an SE version of its Dynamac portable Mac.

With its dealer approach, which Colby had used several years ago before deciding to sell direct, the business of constructing a portable based on legal

Mac ROMs is made easier, Colby said. Currently, to create a Mac portable, a manufacturer must buy fully constructed Macs and disassemble them for the motherboard.

Colby will also sell fully equipped models of the Walk-Mac SE to corporate customers who don't have a store of Mac SE motherboards.



The 12-pound Walk-Mac SE has a built-in keyboard and an optional internal battery.

IBM Enhances Its Academic Offerings

BY ALICE LAPLANTE

One week after Steve Jobs and Next jumped into the higher education market, IBM has announced a slew of university grants, software discounts, hardware donations, and academic fellowships to further ingratiate itself with the academic community.

IBM announced 49 new products to be added to the list of system software and applications that will be made available to members of Big Blue's Higher Education Software Consor-

tium. In addition to an existing list of workstation and midrange software, the 49 new programs include computer-aided engineering applications as well as business applications such as forecasting, accounts receivable, and sales analysis.

The consortium is open to accredited nonprofit institutions of higher education; there is a one-time fee based on the number of full-time faculty members. Consortium members acquire access to a broad range of leading-edge system and application software for advanced-function workstations and midrange computers.

Microsoft also announced an extensive new education program covering every level of the education market, from grade school through universities. Part of the program includes an agreement with IBM to bundle IBM software with PS/2 machines. Until further notice, IBM will include a copy of Microsoft Windows and MicroSoft Works with every Model 25 with a hard drive sold to eligible faculty, staff, and students.

In addition, for selected institutions, Microsoft Windows, Microsoft Word, and Microsoft Excel will be included with each Model 50 Z or Model 70.

EISA

Continued From Page 1

buses to increase performance on their high-end machines, say EISA will case, but not solve, the memory management problem. Instead of using EISA as a memory and I/O bus in the tradition of the standard architecture, they will continue to develop proprietary memory bus architectures. Their competitors are expected to follow suit.

FLEX MEMORY. Compaq said it will continue to develop its Flex memory architecture along with adopting the EISA bus because future CPUs won't get optimum memory performance from the EISA bus alone.

"One of the things that will not be stable in the future is the processor technology that's developed," said Gary Stima, Compaq's vice president of systems engineering. "We believe we'll have 20- to 50-MHz chips, all requiring different memory architecture. The transfer rate of

the 80486 will go up by two or more times what it is now. We don't want to tie it down to the 16 bus."

The trend toward proprietary memory buses concerns some board makers who fear that many system vendors will adopt Compaq's approach and cut out third-party suppliers.

"If everyone goes and designs their own memory bus, they'll be able to charge more for memory," said Mohammad Sehat, product manager for boards at Idiassociates Inc.

Sehat said such an approach could harm consumer acceptance of EISA relative to MCA.

Mac Workstation to Use Mac Irma Emulation Card

BY LAURIE FLYNN

ANAHEIM, CA — Apple Computer Inc.'s Mac Workstation program will soon support DCA's Mac Irma 3270 emulation card, according to an Apple official.

DCA will offer software that will enable its Mac-to-mainframe card to work with Mac Workstation, and Apple will include code written by DCA in its program, according to Peter Hirshberg, Apple's manager of host systems integration. Mac Workstation allows programmers and corporate developers to more easily create Mac-front ends to mainframe host applications.

DCA will make the announcement this week at the Macintosh Business Conference & Exposition here.

Mac Workstation's support for Mac Irma is not an exclusive arrangement, and Apple Computer hopes to broaden the base of supported platforms, according to Hirshberg. "It's our intent to support a lot of people that way," Hirshberg said. "We'd love to see a Mac Workstation link to a range of environments."

The price of Mac Workstation will not be affected by the addition of support for Mac Irma, said Hirshberg.

A DCA official said the company will announce 3270 software this week but declined to give specifics.

Avaria Corp. of Hopkinton, Massachusetts, announced in August a programmer's toolkit that added support for Mac Workstation to their Mac Mainframe 3270 product.

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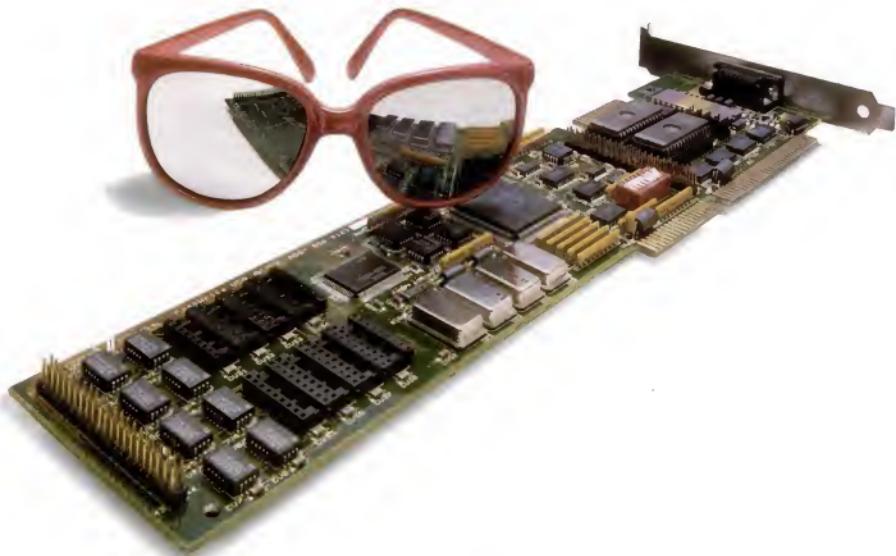


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NETWORKING



Softkline's Mirror III has a point-and-shoot dialing directory that lists parameters for calling up other computers and bulletin boards.

Enhanced Version of Mirror To Offer 2 User Interfaces

By ROBERT SNOWDON JONES

Softkline Distributing Corp. recently announced that Mirror III, an enhanced version of its Mirror II telecommunications software, will offer two user interfaces, its own script language, and a file-compression protocol that more than doubles transfer rates.

Although Softkline made a name for itself when it was sued for cloning DCA/CrossTalk Communications' CrossTalk XVI, it chose not to copy the next-generation CrossTalk Mk. 4 package, said Keith A. Ackerman, Softkline's director of marketing. "We talked to a lot of Mk. 4 users, and they were unhappy with the interface," he said.

As a result, Mirror III has a menu-driven interface modeled after CrossTalk XVI, as well as a point-and-shoot dialing directory that lists parameters and other necessary information.

Softkline also developed its own script language, named Prism (Programmable Integrated Scripts for Mirror), which is upwardly compatible with Mirror II's and CrossTalk XVI's script languages. Prism is an add-in module that permits users to program complex automated processes. One of the language's strongest features, Ackerman said, is its capability to run scripts in the background and pass data to a foreground application.

"It can import data directly from Dow Jones to a spreadsheet," Ackerman said. The spreadsheet script has been written and may be included with the software when it ships the second week of November. If not, it will be available on the company's electronic bulletin board.

Other Mirror III features include ACT Compressor, a file compression and link-level

error-control protocol that can improve file-transfer speeds between two Mirror systems an average of 2.5 times.

Other new features include support for Compuserve-B and windowed Kermit file-transfer protocols, VT-220 and Wyse-50 terminal emulation, and a chat mode.

The software will cost \$99.95. Upgrades for current Mirror users will be \$29.95 until January 1 and \$39.95 after that, Ackerman said.

Softkline Distributing Corp., 327 Office Plaza Drive, Tallahassee, FL 32301; (904) 878-8564

UBI Announces Its LAN Manager OS

Program Supports DOS Redirector, TCP/IP Protocols, MCA Board

By SHARON FISHER

Ungermann-Bass Inc. officially announced last week its LAN Manager-based OS/2 network operating system, which supports TCP/IP protocols and the new DOS redirector, as well as an intelligent Micro Channel Architecture communications board.

Like other LAN Manager-based programs, such as 3Com's 3+Open, Net/One System MS/OS/2 LAN Manager lets users combine DOS and OS/2 workstations on a LAN under an OS/2 server. The value that UBI adds to the LAN Manager includes support for Transmission Control Protocol/Internet Protocol (TCP/IP), support for TCP/IP applications such as Telnet, and a simple asynchronous emulator that allows users to connect to corporate systems, said Georgine Benesch, the company's product line manager.

Ungermann-Bass also said it was the first company to support the new version of the DOS Redirector, which provides a number of OS/2 features — including support for the named-pipe interface — to DOS workstations when connected to an OS/2 server running LAN Manager.

FUTURE ENHANCEMENTS. Possible future enhancements include support for network printers, support for network management.

ment, and the capability to connect several networks, Benesch said.

The software also includes drivers for UBI's communications boards, the company said. Users of UBI boards that don't buy UBI's product will be able to obtain the drivers from a Microsoft bulletin board, according to Steve Kanzer, product manager for Microsoft's network business unit, because UBI has granted Microsoft permission to distribute the drivers. Not all the LAN Manager OEMs may grant Microsoft this permission, he added.

Kanzer also said that Microsoft doesn't intend to "police" its OEMs' products to guarantee interoperability, saying it was the vendors' responsibility to work together. However, because of specifications such as NetBios over TCP/IP and Microsoft's MAC-layer interface, users are likely to find at least some level of interoperability.

The company also announced the NIUp card, an MCA card that supports either Ethernet or Token Ring LANs, as well as Ima-2 and IBM-compatible 3278 emulations for micro-mainframe communication.

The board includes 512K of RAM that is expandable to 1 megabyte and an Intel 80186-compatible coprocessor that offloads some work from the PC, improving performance. A remote network boot capability

allows users to install the card in diskless workstations, which then boot from the server.

EISA VERSION. An Extended Industry Standard Architecture (EISA) version isn't under development, according to Michael Gardner, UBI's vice president of sales and marketing. "We don't have an EISA development effort underway," he said. On the other hand, should UBI receive sufficient user demand, the company would be able to respond quickly, he said.

Net/One MS/OS/2 LAN Manager is available in two versions: one that allows an unlimited number of users per server, and the Net/One MS/OS/2 LAN Manager Entry Level System, which supports up to five concurrent connections. The products cost \$2,995 per server and \$995 per server, respectively. Both versions will be available in limited release next month, with general availability in December.

The Ethernet version of the NIUp card is available now, while the Token Ring version will be available in limited quantities in December and generally available in January, Benesch said. Both boards cost \$1,095 with 512K; prices for the 1-megabyte version are not yet set.

Ungermann-Bass Inc., 3900 Freedom Circle, Santa Clara, CA 95054; (408) 496-0111.

DEC Announces PC LAN/Server, Ashton-Tate Pact

By ED SCANNELL

ETON, MA — Digital Equipment Corp. formally announced last week its PC LAN/Server 2000, a turnkey file server for networks running between eight and 30 MS-DOS-compatible machines.

DEC also announced an agreement with Ashton-Tate Corp. that will see Ashton-Tate developing and DEC marketing and supporting various versions of Dbase for DEC's line of VAX minicomputers.

The PC LAN/Server 2000 package is centered around DEC's Microvax 2000 running under the VMS, Version 5 operating system. The package is layered with the company's VAX/VMS Services for MS-DOS, DEC-Net end-node software, 16 DEC-Net client licenses, integrated local and wide area PC Mail, and a PC LAN/Server Install shell and administrative interface.

32-BIT CAPABILITY. "It is the only LAN based on 32-bit software,"

said John Rose, manager of DEC's personal computing systems group.

To run this suite of software, the Microvax 2000 is configured with 4 megabytes of RAM, a 159-megabyte hard disk with an expansion interface, a 95-megabyte streaming tape drive, and an Ethernet controller.

Besides supporting MS-DOS files, the new package also supports printers attached to it, a terminal server, a VAX/VMS server, and a VAX-cluster system located anywhere in a DEC-Net LAN or wide area network.

Besides MS-DOS, the PC LAN/Server 2000 supports several industry standards, including IEEE 802.3 Ethernet, the ISO's Open Systems Interconnect model.

PC LAN ALTERNATIVE. DEC officials contend the package is an attractive price/performance alternative to competitors selling PC LANs. They claim that benchmarks conducted by DEC

show that their package configured for 15 users is 30 percent faster than a similar system from Novell Inc.

Priced at \$18,800, the PC LAN/Server 2000 is available immediately. The price does not include a VT-220 terminal that administers the server.

The agreement between DEC and Ashton-Tate will result in Dbase being offered for use on multiuser systems for the first time. DEC said that its strategy is part of its stated strategy to offer best-selling applications across its desktop hardware platforms and line of VAX mini-computers.

The agreement calls for the development of a characterized-based Dbase for VAX users with VT terminals and graphics-based versions for DEC-Windows/XUI workstations.

These programs will run under both VAX/VMS and Ultrix operating systems and offer local and remote transparent data access and sharing with DEC's VAX RDB/VMS or native Dbase databases.

A PC-to-VAX database link is included in the agreement that allows Dbase applications running on networked PCs to access data in remote Rdb/VMS databases.

GLOBAL NETWORK. "Customers have been telling us they are running Dbase on isolated machines and that they need to integrate these islands of users into a global network," said Henry Hinschmidt, vice president of DEC's Business and Office Information Systems Group.

All existing applications written under Dbase III Plus and Dbase IV will be compatible with Dbase products under both VAX/VMS and Ultrix.

The Dbase/SQL language, along with DEC's Network Applications Support services, forms the platform on which developers will build applications for any desktop device, according to Ed Esber, Ashton-Tate's chairman.

Both DEC and Ashton-Tate declined to say when these products would be available.



Datamedia's Netmate PC/Workstation is based on a 20-MHz 80386 microprocessor. A diskless version is also available.

Workstations Support LANs, DEC Systems

BY ED SCANNELL

NASHUA, NH — Datamedia Corp. has introduced a family of network-oriented workstations that supports most of the best-selling LANs and specifically focuses on connections to Digital Equipment Corp. systems.

The purpose of the Netmate PC/Workstation line, which is based on the 20-MHz 80386 processor, is to combine enterprise-wide communications and high-end systems with lower-cost microprocessors, according to the company.

Datamedia officials said it has done this by integrating key software and hardware components into the Netmate line, thereby saving users from having to do the same.

For instance, VGA-quality graphics, VT-241 terminal emulation, VT-340 graphics, a DEC or IBM keyboard, and DOS-compatible applications are all basic Netmate features and capabilities. The systems also have IBM AT-compatible slots and external SCSI bus expansion, which gives users a number of options, a spokesman said.

Datamedia will target the line at markets with workstation applications, such as securities, currency and commodities trad-

ing, desktop publishing, software engineering, electrical and mechanical CAD/CAE, and telecommunications.

The series is offered in two configurations: diskless and with disks. The diskless Netmate contains Netcard, a credit card-size storage device for remote start-up over a LAN. Information is accessed from and stored on a networked server system's mass storage devices.

The Netmate systems with a disk include the 386/20-01, which has a 1.44-megabyte 3½-inch disk drive, and the Model 386/20-08, which has an 80-megabyte 3½-inch hard disk and a 1.44-megabyte 3½-inch disk drive. A 40-megabyte 3½-inch hard disk can be added to the 386/20-01 as an upgrade option.

The Netmate systems include a full selection of networking software such as DEC's PCSS, Novell's Netware, Sun Microsystems' NIS, 3Com's 3+ and IBM's PC LAN+

— and available in 30 days, the diskless 386/20-00 costs \$4,895, while the disk-only 386/20-01 is priced at \$5,195, and the disk-only 386/20-08 is priced at \$6,995.

Datamedia Corp., 11 Trafalgar Square, Nashua, NH 03063; (603) 886-1570.

bids, because we didn't have [protocol analysis] capability," said Kishore Tarachand, senior product line manager at Sytek. "So we looked for the best product available, and it was Network General's."

Sytek, a company that specializes in large networks, has an installed base of more than 2,000 networks, representing more than 440,000 nodes running protocols including DECNet, DLC, TCP/IP, Netware,

Software Links Netware, LAN Manager

Interlan Product Offers Interoperability Between Operating Systems

BY MARK STEPHENS

Netware users who are tempted by Microsoft's OS/2 LAN Manager may be interested in software from Interlan Inc. that allows Netware clients using standard Netware commands to transparently access LAN Manager servers.

Interlan's LMN Server software runs on all versions of LAN Manager, emulating Netware services including log in, directory access rights, active connection information, and print spooling, according to product manager George Jones. The product supports MAC drivers written to the Microsoft Network Driver Interface specification.

LMN Server requires a Netware server on the network, as well as a LAN Manager server, and does not allow administration of the Novell server through the LAN Manager. "Administrators can log directly to the Netware server for those functions," Jones said.

"As a company that is both a LAN Manager licensee and a Novell OEM, we saw the need to provide interoperability between these dominant network operating systems," Jones said, adding that running LMN Server between LAN Manager and the Netware client imposed no more than a 5 percent performance penalty.

A similar Interlan product will allow Netware servers to operate on LAN Manager networks, Jones said.

"We expect that both Novell and Microsoft will welcome this product, since interoperability inevitably opens sales opportunities," Jones said.

From Novell's perspective, "welcome" may be too strong a word. "The concept of clients being able to talk with different server types is reasonable — we've thought of our own product allowing LAN Server clients to access Netware paths,"

but this product doesn't appear to go far enough," said Mark Calkins, vice president of marketing for the Novell Software Group.

"A good migration path gives

you everything you already have and more, which this solution does not appear to do," Calkins said. "It doesn't appear to offer a multiuser applications capability, and it doesn't appear that other network services, such as a comm server [dedicated network server], can be recognized. And it isn't a complete solution if only Netware clients are served."

The LMN Server mainly will appeal to companies that are already running multiple operating systems and are looking

for some level of interoperability, Calkins said.

"We're not naive," Calkins said. "We know companies are looking at LAN Manager. But this is not a likely migration path. It just doesn't present a very good picture of the LAN Manager server."

LMN Server is scheduled to ship later in the first quarter of 1989 for \$450 per server, according to Interlan.

Interlan Inc., 155 Swanson Road, Boxborough, MA 01719; (508) 263-9929.

SDI LAN Gateway Software Can Use IBM Token Ring

BY ROBERT SNOWDON JONES

Software Dynamics Inc. of Florida announced Version 1.2 of its SDI 3274 LAN Gateway for OS/2, as well as the availability of its IBM 3780 Remote Job Entry (RJE) emulation software for OS/2.

SDI 3274 emulates the functions of IBM's 3174/3274 SNA/SDLC communications controller with attached terminals and printers, said Ted Hamlin, Software Dynamics' president. The program can be used with a single PC or with a LAN.

The new version has the capability to use IBM Token Ring as the gateway attached to the mainframe, Hamlin said. The gateway can connect to a 3174 controller or 37X5 front end equipped for Token Ring operation. The Token Ring permits higher speed operations and a higher number of logical units on the gateway than a connection through coax.

The software currently supports Novell and 3Com's LAN Manager. IBM LAN Server support will be provided when that product is released, Hamlin said.

A single unit of SDI 3274 software is priced at \$300, with discounts for 200 or more units. SDI 3274 LU software costs

\$100 each. An SDI MPCC adapter board costs \$320 for the PC AT bus and \$350 for the IBM PS/2 (SDI MPCC/2). Quantity discounts apply to these products as well. An example system consisting of software, one MPCC/2 adapter, and 32 LUs would cost about \$3,210. All components are available now.

The RJE emulation software for OS/2, called SDI 3780, runs on both PC AT and MCA computers, the company said. The software emulates all functions of the IBM 3780 RJE terminal except for Home mode and On-line test mode. On-line printing can be directed to PC printers, to disk files, or piped to other processes.

Data-link control can be point-to-point or multipoint with EBCDIC or ASCII line-control codes. Line speeds are typically 9,600 bps.

SDI 3780 has other features such as security identification, disk-resident log files, and a special PC-to-PC mode for transferring EXE files. A diagnostic loop function supports the hardware adapter and local modem, the company said.

It is priced at \$699 and is available now.

Software Dynamics Inc. of Florida, P.O. Box 247, Dunedin, FL 34697; (813) 733-8784.

Network General Introduces Broadband Sniffer Protocol Analyzers

BY MARK STEPHENS

Network General Corp. has rediscovered broadband networks, introducing new versions of its Sniffer product line for analyzing Sytek's 2-Mbps Localnet 6000 LANs, as well as IBM's 1-Mbps PC Network.

The broadband Sniffers will be sold by both Network General and Sytek, the companies said.

"We've had to forgo some

bids, because we didn't have

[protocol analysis] capability," said Kishore Tarachand, senior product line manager at Sytek. "So we looked for the best product available, and it was Network General's."

Sytek, a company that specializes in large networks, has an installed base of more than 2,000 networks, representing more than 440,000 nodes running protocols including DECNet, DLC, TCP/IP, Netware,

and Vines, said Tarachand. The broadband Sniffers were developed using Sytek's 6120 and 6130 intelligent network adapter cards and Sytek software, according to Network General president Harry Saal.

"This is a rigorous application for an adapter board," he said. "We are asking the board to capture all the traffic on the network, and we require intelligent boards, so much of the code can execute on the board rather

than in the computer. The Sytek boards are very well-engineered."

The broadband Sniffers are available in both laptop and portable versions, with one model supporting the original IBM PC Networkx and the other supporting Sytek's Localnet 6000, according to Network General. Prices range from \$15,750 for the 300 Series laptop Sniffer to \$24,000 for the portable 386-based 500 Series.

All versions will be available in November.

Additional broadband Sniffers are likely to follow, supporting the Ungermann-Bass and Bridge (now 3Com) protocols, Saal said. "MAP is a further possibility, though we do not yet consider it a proven product," he said.

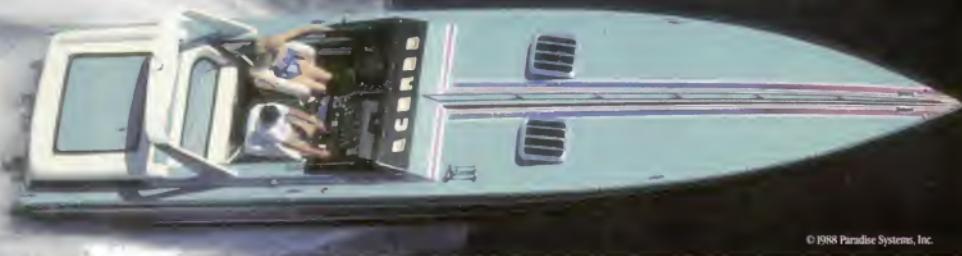
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Communications Products Due From Omnitel at Comdex

BY SHARON FISHER

Omnitel Inc. plans to introduce at Comdex a number of modems, gateways, and other communications products.

The company said it will announce internal and external full-duplex 9,600-bps modems that support the V.32 protocol standard. Features include fall-back operation to 4,800 bps and support for V.22 bis, V.22, Bell 212A, and Bell 103 protocols. The modems will cost \$995. Support for Microcom Networking Protocol (MNP) Class 5 is available as an option, the company added.

Giving users the capability to share modems on a LAN, Omnitel will also introduce two asynchronous gateways, the company said.

An entry-level gateway includes two internal 2,400-bps modems, gateway software, and BitCom/LAN workstation communications software. The gateway costs \$995 and is available in a PS/2 version as well.

A high-speed gateway includes two 9,600-bps modems, gateway software, and four V-Com serial communications redirector cards for the workstations, which enable standard asynchronous serial communications software to be used with the gateway, the company said. The gateway costs \$2,995.

Omnitel will also bring out a PS/2 version of its V-Com card, a four-port serial communications card, an expanded line of internal and external cellular phone modems, and enhancements to the company's Asynchronous Communications Server gateway software. The enhancements include support for the PS/2 and serial card support, the company said.

Omnitel Inc., 3500 W. Warren Ave., Fremont, CA 94538; (415) 490-2202.

Datability Announces Server to Connect 128 PCs to a Digital VAX

Datability Software Systems Inc. recently announced a device that allows up to 128 PCs to connect to a Digital Equipment Corp. VAX minicomputer.

The Vista Communications Server supports DEC's LAT protocol for communicating with the VAX, which means the device looks like a DEC Server on the network and can be controlled by standard DEC applications.

Users can switch to TCP/IP or OSI protocols by swapping a network interface card, Datability said. The card includes a 10-MHz Intel 80186 microprocessor and an Intel 82586 network coprocessor for improved performance.

The device has four slots, which each hold an eight-port or 32-port line card.

An eight-port Vista Communications Server — which includes a network interface card, chassis, and an eight-port line card — costs \$3,499. Additional eight-port line cards cost \$1,299 each, while a 32-port line card costs \$3,199, the company said. The product will begin shipping January 15.

Datability Software Systems Inc., 322 Eighth Ave., New York, NY 10001; (212) 807-7800.

— Sharon Fisher

UDS Enters ISDN Market With Stand-Alone Adapter

Universal Data Systems Inc. entered into the budding Integrated Systems Digital Network (ISDN) marketplace with a stand-alone terminal adapter for basic-rate interface service.

The UDS TA100 adapter provides two B channels operating at 64,000 bps and one D channel running at 16,000 bps. It permits PCs and terminals to transmit between 300 to 19,200 bps asynchronously and 2,400 bps to 64,000 bps using synchronous transmission. Up to five telephone extensions can be connected

to the TA100 adapter, according to the company.

The TA100 is designed to link with ISDN service that uses the Northern Telecom DMS 100 digital central office switch. Both devices use the standard LAPD protocol in the D signaling channel and the T-Link data rate adaption protocol in the B data channels, the company said.

Although the company is known for its wide line of analog modems, said George Grumbles, UDS president, "we

recognize the tremendous benefits of the all-digital network, and we expect to be a major player within that market."

Two other major modem makers, Hayes Microcomputer Products Inc. and Microcom Inc., offer ISDN adapters on a limited basis.

The TA100 will be shipped in volume in January for \$1,500.

Data Systems Inc., 5000 Bradford Drive, Huntsville, AL 35805; (205) 721-8000.

— Robert Snowden Jones

A few words to anyone buying networking software like there's no tomorrow.



CONNECTIONS ■ BY DAVID BUERGER

The Choice of a File Server Can Be Critical to Your LAN

Choosing a LAN file server used to be easy. A new crop of hardware options now complicates this choice. The decision is important because the server can be the critical part in your LAN's performance.

The type of server you choose depends on the network's design. Peer-to-peer workgroup networks, like Apple's Local-

talk and 10-Net Communications' 10-Net, do not require a dedicated server. The primary use is resource sharing.

Shared data on these LANs are on local disks. This requires users to be aware of who has what—an impracticality in some work situations.

Centralized LANs keep shared data on one or more dedicated servers. The server also runs the network operating system and application software. In addition,

resource sharing funnels through the server. Vendors such as Banyan, 3Com, and Novell use the centralized approach in their LAN setups.

Such users obviously need a reliable server. If the server breaks, so does the LAN. Moreover, the server must be fast enough to keep up with demand. Most popular LANs give you three choices for a server: an 80286 AT, an 80386 AT, or a customized LAN server that uses either a

286 or 386. Customized servers include extra features such as tape backup units, uninterruptible power supplies, and additional I/O slots.

The first two choices become a LAN server with a network interface card (NIC) and a network operating system.

This approach is straightforward and inexpensive. Virtually any reliable AT clone can be a server.

But is it fast enough? The server's total speed is a factor of several things. These include the CPU's microprocessor speed, I/O bus speed, NIC data throughput speed, network backbone transfer speed, hard disk access speed, amount of RAM, and disk or RAM caching techniques.

Equally relevant to server performance is the nature of what users do on the LAN. It makes little sense to spend four times the cost of a 286 AT server if your six-node LAN mainly runs E-Mail and printer sharing.

Network users who do transactional accounting, CAD, or other CPU and disk-intensive tasks should pay careful attention to selection of an adequate server. This is critical if only one server hosts such work for a large group of simultaneous users.

The 386 PC often is sold as a fast LAN server. Yet virtually none of the popular network operating systems can take advantage of this processor. Most 386 ATs use the same 16-bit bus slot for NICs as 286 ATs. This means the data transfer rate will be about the same.

Of more practical importance is the hard disk and its controller card. XT and AT hard disk controllers traditionally use ST 506/412 controllers. These transfer data at about 5 mbps and can run up to two large drives. The use of ESDI or SCSI controllers will boost transfer rates to between 10 and 15 mbps, as well as handle up to seven large drives.

Another way to speed 286 or 386 ATs is to add 2 or 3 megabytes of extended RAM. Most network operating systems effectively use this for caching. Dramatic speed improvements are the result.

So what kind of a network server should you buy? Clearly, the server you choose must match or exceed performance to match your application needs. For many, a 286 AT may be adequate as a network server.

According to a recent International Data Corp. (IDG) study, about 375,000 LAN operating systems will ship in 1988. IDG estimates that roughly 75,000 dedicated LAN servers will ship. Thus, four out of five LAN buyers are voting with their wallets for the cheaper solution.

Transforming a 286 or 386 into a LAN server is not a risky proposition. If you later determine that a customized server is more appropriate, you can always turn the AT into a regular node.

The limited appeal of customized servers probably reflects a lack of widely used applications that need this power. As this changes, so will the need for high-end LAN servers.

My next column will look at how customized servers can benefit high-end LAN applications.

David J. Buerger is executive editor of connectivity and testing at InfoWorld. E-Mail comments may be sent to: dbuerger@cup.portal.com or MCI Mail ID 304-0160; start the MCI "Subject" line with [DE2PDB]buerger[subject]. The views expressed are his own.

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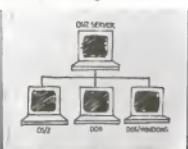
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For anyone waiting for the perfect short-term / long-term networking solution, your shipment just came in.

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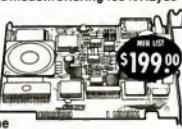
The PM1200 is a remarkably complete data communications package featuring 100% Hayes™ compatibility and the extraordinary ProComm™ communications software.



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PRACTICAL MODEM 2400

The PM2400 is a 0-300, 1200 and 2400 baud internal half card modem offering 100% Hayes™ compatibility. The PM2400 features automatic adaptive equalization for consistent, error-free transmission and includes the ProComm™ communications package.



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PRACTICAL MODEM 1200SA MINI

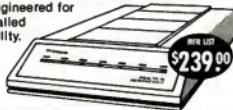
Utilizing state-of-the-art surface mount technology, the PM1200SA Mini delivers full-size modem capabilities and real reliability in a convenient, compact size. And it's compatible with virtually all popular communications programs.



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PRACTICAL MODEM 2400SA

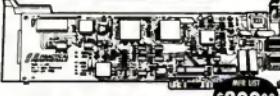
The PM2400SA stand-alone modem delivers all of the very practical advantages of high speed data transmission via telephone lines. It's guaranteed 100% Hayes™ compatible, features automatic adaptive equalization and it's engineered for unparalleled reliability.



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PRACTICAL MODEM 2400 PS/2

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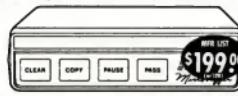


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using 2 MEM 256K modules. It's also available in a parallel version. It features touch-sensitive front panel controls.

MICROBUFFER: MINI

The Microbuffer Mini is available with 32K to 512K of memory... enough for 300 double-spaced pages. Extremely easy to install, it's available in three models: Serial to Parallel, Parallel to Serial and Parallel to Parallel.



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MICROBUFFER: P/LINK

The Microbuffer P/LINK lets users put their PC's printer



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MODEMS • BUFFERS • IBM & APPLE ENHANCEMENTS • INTERFACES

Sybase Announces Marketing, Product Development Pacts

By SCOTT MACE

Sybase Inc. recently announced several alliances for product development and marketing, including interaction with a CASE product and a Unix-based 4GL.

Sybase said the company will help market a computer-aided software engineering (CASE) product from Interactive Development Environments (IDE) that complements the Sybase SQL Toolset. Sybase and Unify Corp. will also jointly market a combination of Unify's Accell

application generator as an interface to the Sybase SQL Server. The SQL Server is also the server technology used in the Microsoft/Ashtron-Tate/Sybase SQL Server under development.

The CASE product, Software Through Pictures, provides CASE methods for users to analyze and design database systems. It includes a template that generates an SQL schema, the overall database design that defines an SQL database. The ease of creating SQL schema means the package can be quickly

moved from the CASE environment to operational database systems.

Both products are based on open architectures, provide a powerful set of integrated tools, and address the large class of applications for real-time, embedded systems, said Stewart Schuster, Sybase's vice president of marketing. IDE's CASE tools and the Sybase RDBMS both run on the DEC VAX and Sun platforms.

Unify will interface its Accell development environment to SQL Server, providing an integrated fourth-generation

language and application generator. A cooperative processing option off-loads user processing from a Unix host to a DOS-based PC to let users mix applications written in Accell across PCs, terminals, and Windows systems. The first implementation will be on a Sun system. Sybase Inc., 6475 Christie Ave., Emeryville, CA 94608; (415) 596-3500. Unify Corp., 3870 Rosin Court, Sacramento, CA 95834; (916) 920-9092. IDE, 595 Market St., 12th Floor, San Francisco, CA 94105; (415) 543-0900.

Cullinet Ships New Version of Its CASE IDMS/Architect Tool

Cullinet Software Inc. is shipping a new version of IDMS/Architect, a PC-based CASE tool that provides micro-to-mainframe communications facilities to upload designs to the company's IDMS/R database management system.

The release extends support for ADS/Online 4GL applications, enabling a substantial amount of development of ADS/Online applications on PCs.

Also added is the capability to download existing IDMS/R schemas to the PC where IDMS/Architect can be used to reverse-engineer and modify them.

IDMS/Architect runs on PC XT, AT, and PS/2 compatibles under DOS and requires a minimum of 640K of RAM and 17 megabytes of hard disk space.

A single-copy license for the stand-alone version of IDMS/Architect costs \$8,000 and is \$12,000 with Architect Link, which provides the micro-to-mainframe connectivity. Volume discounts and site licenses are also available.

Cullinet Software Inc., 400 Blue Hill Drive, Westwood, MA 02090; (617) 329-7700.

— Stuart J. Johnston

Migraph Ships Library Of Clip Art for Publishing Products Running GEM

Draw Art Professional, a library of object-oriented clip art for publishing products that run under Digital Research Inc.'s GEM, is shipping from Migraph Inc.

Because the illustrations are object-oriented rather than bit-mapped, they can be resized without losing any resolution, Migraph said. The graphics also print at the highest level of resolution available from either a dot-matrix or laser printer.

The graphics are stored as GEM files and can be loaded into any application that uses that format, such as Ventura Publisher or GEM Draw Plus.

"There are over 14 categories of high-quality line art, including art tools, office, food, music, sports, and arrows," said Kevin Mitchell, Migraph's president. Migraph also plans to release several other graphics libraries.

Draw Art Professional costs \$69.95 and includes more than 150 illustrations. The package is available in either 3½- or 5½-inch disk formats.

Migraph Inc., 200 S. 333 St., Suite 220, Federal Way, WA 98003; (206) 838-4677, (800) 223-3729 outside WA.

— Stuart J. Johnston

Today's managers are expected to learn word processing in their spare time.



Beyond Word Writer Features 'Mimic Mode'

A new word processor that features a Lotus-like interface and mimics popular word processing programs began shipping recently from Timeworks.

Beyond Word Writer has pull-down menus with dialog boxes and a mimic mode to speed learning by accepting keystroke commands from other word processors, including Word Perfect 5.0, Microsoft Word 4.0, and Wordstar Professional 5.0.

Users can edit as many as three documents simultaneously, with full use

of cut, copy, and paste commands between the documents. It also allows access to DOS commands in a DOS window. Users can transfer files among the mimic-mode word processors.

The word processor also offers line and box drawing, international characters, and on-screen multiple columns that snake when edited. It includes other word tools such as a memory-resident thesaurus with more than 240,000 synonyms, a built-in proofreader, and a choice of four spelling checkers. The continuous on-line

spelling checker checks each word as it is typed. Also available are full-document and single-word spelling checkers, and a "Soundex" program that matches correctly spelled words phonetically, the company said.

Beyond Word Writer costs \$199.95. It runs on PC XT or AT compatibles with 512K of RAM and DOS 2.1 or later.

Timeworks Inc., 444 Lake Cook Road, Deerfield, IL 60015; (312) 948-9200, (800) 535-9497.

—Paula S. Stone

Dayflo Tracker Update Now in Development, 19 Stacks to Be Added

BY MARK BROWNSTEIN

An update to Dayflo Tracker that adds extra stacks is in development and will soon be announced by Dayflo Software Corp.

Dayflo Tracker, Release 1.4 is an enhanced version of Dayflo Tracker, which Dayflo claims was the first personal information management program, a category of recent interest by developers such as Lotus.

The new version has 19 additional stacks, which are analogous to stacks of paper or information on a desktop, said Robert Gilchrist, Dayflo's president. Users move information among stacks to manage and retrieve information. The model is simpler than a file cabinet, which is typical of most data management software, Gilchrist said.

The program also now includes a "Magic Key" that removes all but 32K of the program, enabling users to run applications within Dayflo Tracker. Users can also control colors and attributes of characters and background. Text formatting is improved, and users can now specify the number of lines of data to be printed on a page.

Dayflo Tracker 1.4 will cost \$149.95. Current users of Dayflo Tracker 1.1 may upgrade for \$55, and upgrades will also be available for users of earlier versions. Users of Dayflo 1.3, the company's database management software, may update to Dayflo Tracker 1.4 for \$85, and registered users of both programs may upgrade for \$35.

Dayflo Software Corp., 17701 Mitchell Ave. N., Irvine, CA 92714; (714) 474-2901, (800) 367-5369 (outside CA).

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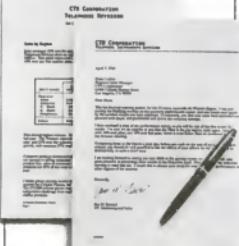
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SPC SOFTWARE PUBLISHING CORPORATION
The designers of PFS.

Emerald City to Ship A Windows Version Of Lasertalk Program

Emerald City Software announced it will release in December a Windows version of Lasertalk, its Postscript programming tool now available on the Macintosh.

The program is targeted for application developers, high-end desktop publishers, and service bureau staff who need to debug Postscript programs, said Randy Adams, Lasertalk's designer. The new version for PC compatibles offers the same features and functions as the Macintosh release, he said.

Adams designed Lasertalk as an interactive debugger for Postscript programs. A status window displays the contents of the Postscript stack and program variables as each line of Postscript code is processed. The program provides a browser to access Postscript dictionary keys and values in the Postscript printer memory.

It displays the contents of the printer frame buffer in a separate window to monitor the effects of Postscript operators, which describe Postscript functions.

Lasertalk PC costs \$399 and will run on any PC or PS/2 that supports Windows, and requires a laser printer with the Adobe Postscript interpreter.

Emerald City Software, 800 Menlo Ave., Suite 102, Menlo Park, CA 94025; (415) 324-8080.

—Bob Ponting

NEWS BRIEFS

Orbit Ships Formset, Version 2

Orbit Enterprises Inc. is shipping an enhanced version of its forms compiler and a new preview utility for the Hewlett-Packard LaserJet.

Formset, Version 2 compiles text files with embedded formatting commands into forms to download to a LaserJet Plus or Series II. Forms can be printed directly or overlaid, sending subsequent pages to the printer.

Version 2 can mix multiple fonts on a single line, add PCX graphics to forms,

and print lines of any thickness, according to the developer. This version also supports nested procedures, subroutines, horizontal and vertical justification, conditional processing, and a special symbol font designed for forms. The program still can use LaserJet soft fonts and font cartridges.

Bundled with Formset is Softjet, a page preview utility from Theta Systems of Vancouver, British Columbia. Softjet lets users see their forms on-screen before printing them.

Formset costs \$193.95, with a \$75

upgrade for current users. The program runs on PC and PS/2 compatibles with 384K of RAM and one floppy; Softjet requires a graphics monitor.

Orbit Enterprises Inc., Building 6, Suite 1, 799 Roosevelt Road, Glen Ellyn, IL 60137; (312) 469-3405.

ADDRESSCOPE UTILITY PRINTS BULK

Microcomputer Systems & Consulting recently enhanced Addresscope, its envelope addressing utility, which will be able to print bulk mailings from an address file.

The \$50.95 RAM-resident program can automatically identify and retrieve a

letter's address from within a word processor and print an envelope, with or without a return address. Version 2 can store up to 16 captured addresses and print the envelopes at once, and it also supports additional fonts and the envelope tray on Hewlett-Packard laser printers.

Addresscope runs on PC and PS/2 compatibles and supports four envelope types and most printers but offers additional capabilities including cartridge and soft font support with Hewlett-Packard Laserjets.

Microcomputer Systems & Consulting, 1206 Canterbury Lane, Mansfield, OH 44906-3509; (419) 756-5295.

RATIONAL UPDATES DOS/16M

Developers can now write DOS programs that take advantage of up to 16 megabytes of RAM and guarantee they will run on any 80286- or 80386-based hardware platform, by using an update of Rational Systems' large-memory development environment.

Version 3.0 of DOS/16M also now automatically identifies the host hardware and performs the correct switching operation between real and protected modes for the computer's microprocessor, eliminating the need to install device drivers, according to Rational Systems.

DOS/16M costs \$5,000 for an Initial Development License, and the update is free to registered users who subscribe to the support service that costs \$180 per month.

Rational Systems, P.O. Box 480, Natick, MA 01760; (617) 653-6006.

WORDTECH RELEASES DBXL/LAN

Wordtech Systems Inc. has begun shipping DBXL/LAN, a networked version of their DBase-compatible DBXL database program.

The multiuser version provides concurrent browsing, automatic record- and file-locking, automatic screen refresh, data lock ownership, message sending, and edit detection, the developer said. Its files are compatible with DBase files and DBXL/LAN can coexist on a LAN with DBase III Plus.

DBXL/LAN costs \$599 with support for an unlimited number of users. Upgrades for current users who also have Networker Plus, Wordtech's RAM-resident networking management utility, cost \$359 for users of DBXL 1.1 and \$299 for users of DBXL 1.2.

Wordtech Systems Inc., P.O. Box 1747, Orinda, CA 94563; (415) 254-0900.

NINE NEW DEVICE DRIVERS TO SHIP

Renaissance GRX Inc. will soon ship nine device drivers that support Texas Instruments' new TIGA-340 software interface standard for the TMS340X0 graphics processors and plans to release one new driver each month through 1990.

The device drivers — which will support Microsoft Windows/286 and Windows/386, Lotus 1-2-3 and Symphony, Xerox's Ventura Publisher, and Autodesk's AutoCAD, Release 9 and 10 — are scheduled for release "as soon as TI makes TIGA-340 available, probably by early December," said Ron McAlhany, new product director for Renaissance GRX. The company manufactures TMS34010-based high-resolution graphics boards.

Renaissance GRX Inc., 2265 116th Ave. N.E., Bellevue, WA 98004; (206) 454-8086.

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HARDWARE

Hewlett-Packard LaserJet IID Prints on Both Sides of Paper

BY PATRICIA J. PANE

Hewlett-Packard Co. unveiled last week a major addition to its laser printer line that can print on both sides of a sheet of paper.

The duplex printer, dubbed the LaserJet IID, prints the paper on one side, then automatically feeds the paper back into the engine to print on the other side. The product can print as fast as 7.4 pages per minute, said Karl Robertson, product manager for HP's Boise, Idaho, division.

The printer comes standard with two 8½" x 11"-inch paper trays, each holding 200 sheets of paper, Robertson said. The LaserJet IID can use letter- and legal-size paper, print in landscape or portrait mode, and prepare the pages to be bound either like a book or a calendar.

Optional trays allow the LaserJet IID to handle legal, executive, and European A4 paper. An optional automatic envelope feeder hooks on top of the first paper tray and plugs in to the side of the printer, printing up to 50 envelopes automatically.

Users can also choose an option from the control panel for printing different images on paper from each of the two trays

at the same time an address is printed on the envelope.

The LaserJet IID comes standard with 14 internal fonts and an S2 cartridge with 10 additional fonts. More fonts can be added with cartridges or by downloading from a floppy. All fonts can be rotated for landscape or portrait printing. The same font cartridges used for the LaserJet Series II can be used with the IID.

Switches on the front control panel let users control duplex printing, adjust paper orientation, set up the paper for binding, and select many other functions, Robertson said.

The printer uses the Canon RX engine, and the base configuration can print up to half a page of 300-by-300-dpi graphics, Robertson said. Full-page graphics can be achieved by adding 1-megabyte, 2-megabyte, or 4-megabyte optional memory boards, he said.

The LaserJet IID costs \$4,295 and is scheduled to be available this week. The optional automatic envelope feeder is \$350.

Hewlett-Packard Co., Inquiries, 19310 Pruneridge Ave., Cupertino, CA 95014; (408) 973-1919.

Extended Systems Inc. announced last week two products that expand the capabilities of Hewlett-Packard's double-sided printer, the LaserJet IID.

The ESI-2041B Sharepost allows up to four users to share a LaserJet II or LaserJet IID, and the ESI-3132A printer driver supports IBM's Displaywrite 4 word processing software.

The 2041B is an internal device redesigned for the IID that slides into the printer. Four users can share the printer by off-loading printing demands from individual PCs and storing

files in the device's 256K memory buffer until the printer is ready to print. The 2041B also offers an optional 1-megabyte memory buffer upgrade.

The 3132A printer driver allows users of Displaywrite 4 to access the enhanced features of the IID, such as double-sided printing, without special commands or escape sequences.

The 2041B costs \$495. The 2098A is \$995.

Extended Systems Inc., 6062 Morris Hill Lane, Boise, ID 83704; (208) 322-7163.

— Patricia J. Pane

Dyna Computer Inc. introduced last week a 30-MHz 80386 motherboard primarily marketed to users who want to upgrade AT-class systems. The motherboard uses a 10-MHz I/O bus and includes 64K of cache memory, no main memory (but room for 24 megabytes), and support for 80387 and Weitek 1367 coprocessors. The board comes with five 16-bit, three 8-bit, and one 32-bit slot.

Dyna Computers Inc., 3081 First St., San Jose, CA 95134; (408) 943-0100.

— Jeff Angus

According to Guy Duff, Dyna

Erasable Optical Discs Challenge Market

BY STUART J. JOHNSTON

The recent slew of announcements of erasable optical disc subsystems appears to be threatening low-end hard disk and tape subsystem manufacturers, as well as some CD ROM vendors, industry observers say.

In recent weeks Next Computer, Sony, and Maxtor have all announced optical systems.

Protecting older technologies is the high cost of media, which usually comes down over time.

CD ROM VENDORS NERVOUS

Next's introduction of a computer that uses Canon's magneto-optical (MO) drive technology as the primary disk storage — followed by last week's announcements that Sony and Maxtor also have MO drives available — has some vendors of more firmly established technologies nervous.

"If erasable cartridges become cheap, the technology could be perceived as a threat to the CD ROM industry," said Roger Strukhoff, editor of *CD-ROM Review*.

"We're watching it very carefully, but we don't think it will affect us in the short term," said Mike Kinney, director of product planning for Irwin Magnetics, an Ann Arbor, Michigan, maker of tape subsystems.

A tape subsystem that can hold 250 megabytes of data, as soon as media manufacturers introduce tapes long enough to hold that much data, currently costs about \$1,200, Kinney said. This is very close to the rumored \$1,495 cost of one of the Canon erasable optical drives to be offered by Next.

"I will probably not dislodge large hard drives in commercial applications because you can't afford to wait 100 milliseconds [for data access]," said Jay Bretzmann, senior analyst for optical technology at International Data Corp.

WHY SWITCH? Why switch from conventional technologies? The most common reason cited by vendors of erasable optical drives are the large amount of data that can be stored and the portability of the media.

"It's something the industry is going to move toward, but cost makes it impractical," said Susan Lammers, director of Microsoft's CD ROM group. "CD ROM has the advantage as a prove technology," she added. "Our drive is probably faster than a lot of Winchester hard drives," said Dana Gauthier, Maxtor's marketing director for optical products. "There's certainly an opportunity to replace magnetic tape as well as displace slower hard disks," he said. It's See *Optical*, Page 26

How Magneto-Optical Discs Work

Magnetic particles on media, such as tapes and hard disks, are forced to line up with a magnetic charge.

When heated to a temperature called the "Curie point," the particles lose their reluctance to reorientation — called "coercivity." That is, particles that strongly resist reorientation normally can be reoriented by an extremely weak magnetic field because of the temperature.

Hard disks and tapes use particles with a low coercivity, which means they can be reoriented by a relatively weak magnetic field. The disadvantage is that stray magnetism can scramble the data represented by their orientation.

Magneto-optical (MO) discs, high-coercivity particles are heated with a high-intensity laser to the Curie point — about 572 degrees Fahrenheit — and then the data is written using a weak magnetic field. Because the spot heated is only one micron wide, the data density is extremely high — up to 512 megabytes per side.

As soon as the laser is turned off, the spot cools almost instantly, making the data virtually immune to all but the strongest magnetic fields — for example, a magnet used to pick up autos in a wrecking yard.

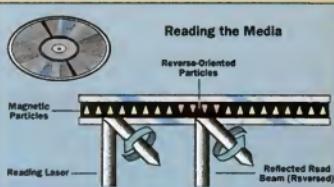
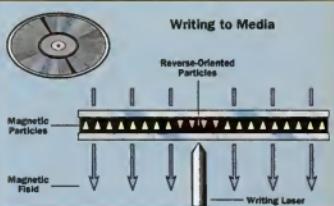
Also, unlike conventional media in which the magnetic particles lie flat, the particles are oriented vertically. On a blank MO disc, all of the particles point up — all binary zeros. Flipping a particle down makes it a binary one.

The disc is covered by a clear protective layer so nothing ever physically touches the particles, eliminating the danger of head crashes. In addition, scratches and dust on the covering layer are outside the focal length of the laser, so they have no effect on data integrity.

Reading the data takes advantage of a unique characteristic of light; if it is rotated, or "polarized," when it passes through a magnetic field. A laser is focused on the disc, and a detector analyzes the reflected light to determine whether it represents a one or a zero.

To rewrite, the old data is erased by reorienting all the particles to zeros, then the new data is written onto the blank area. Discs can be rewritten up to 10 million times, and data will maintain its integrity for 10 to 20 years.

Read-Write Magneto-Optical Media How it Works



Magnetic particles on magneto-optical discs are reoriented when brought to the "Curie point." Particles are readable because reflected light bends differently off a binary zero than a one.

30-MHz 386 Motherboard Is Fastest 386 System Around, According to Dyna

Dyna Computer Inc. introduced last week a 30-MHz 80386 motherboard primarily marketed to users who want to upgrade AT-class systems.

The motherboard uses a 10-MHz I/O bus and includes 64K of cache memory, no main memory (but room for 24 megabytes), and support for 80387 and Weitek 1367 coprocessors. The board comes with five 16-bit, three 8-bit, and one 32-bit slot.

According to Guy Duff, Dyna

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The **286/14** is also powered by an Intel 80286 CPU, but operates at 14 MHz (with zero wait states) for even faster performance. It, too, comes equipped with 1024KB memory, 1.2MB floppy disk drive, serial/parallel/game ports and a 101-key keyboard. No doubt about it — it's a hot machine and a dream to fly!

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Prices:

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from \$1099.

The 286/14 -

from \$1499.



The 386/20. It's made for those who want to fly to the outer limits. With an Intel 80386 microprocessor operating at 20 MHz (with zero wait states) it'll move through the most complex applications with astounding ease. And you won't have to worry about running low on memory either. It not only features 1024KB of RAM and a 1.2MB floppy disk drive, it also has a 64KB cache memory. Naturally, it comes equipped with serial/parallel/game ports and a 101-key keyboard, too.

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Products Extend Area Between PCs, Peripherals

BY PATRICIA J. PANE

Two new products are putting the "remote" in remote computing.

Network Technologies Inc. announced VOPEX-KMD, which extends the distance between a PC and its monitor and keyboard up to 500 feet.

Practical Peripherals Inc. has introduced the Microbuffer P/Link, a parallel printer interface extended with a buffer, that enables a PC printer to be placed up to 7,000 feet away from the host PC.

The Microbuffer P/Link comes with 32K of buffer memory and is upgradable in six configurations, from 32K to 512K, said Travis Tokuyama,



Network Technologies Inc.'s \$549 VOPEX-KMD extends the distance between a PC and its monitor and keyboard up to 500 feet.

Practical Peripherals' sales manager. Each model is Centronics- and Epson-compatible, Tokuyama said.

The P/Link transmitter is connected to the PC's parallel port, and the P/Link transceiver plugs into the printer's port, Tokuyama said. The 32K Microbuffer P/Link (\$159) comes with 75 feet of RJ11 telephone cable and is available now. Beyond 2,000 feet, the company recommends twisted-pair cabling.

NTI's VOPEX-KMD is compatible with monochrome, CGA, and EGA computer displays, said Ruth Hackett, the firm's public relations manager.

The product's TTL video signals are converted to differential type signals, which allow up to 500 feet of cable to be driven

with no loss of resolution, according to Hackett. The transmitter connects to the video and keyboard port of the PC and has a local video output for a second monitor close to the computer, she said.

Each half of the VOPEX-KMD is housed in a 6-by-6-by-2½-inch metal case, is shipped with 4-foot video and keyboard interface cables, and comes with a one-year warranty.

Available now, the VOPEX-KMD costs \$549; an interconnect cable is \$35 plus 9% cents per foot.

Network Technologies Inc., 1415 Elizabeth St., Aurora, OH 44202; (216) 543-1646, 800 RGB-TECH.

Practical Peripherals, 31245 La Baja Drive, Westlake Village, CA 91362; (818) 706-0333.

Practical Peripherals' 32K Microbuffer P/Link costs \$159.

Everex Ships Printer Add-Ons, OS/2

BY BOB PONTING

Everex Systems is adding several printer add-ons and its version of OS/2 to its product line.

The Everex Postcard is a Postscript-compatible raster image processor (RIP) that fits in an expansion slot on AT-compatible computers. The \$1,795 board connects to the video

interface on Canon SX laser engines. It is based around an 80186 processor running at 16 MHz with assistance from an 80287 math coprocessor.

The standard configuration comes with 3 megabytes of onboard RAM, which can be upgraded to 5 megabytes with a \$895 piggy-back memory module. Everex also bundles Post-

card with the Canon engine for \$3,495, providing a complete solution.

The Postcard runs the Bauer Postscript interpreter alone and includes 13 outline fonts from Bitstream that are width-compatible with those on the Apple Laserwriter. Another 22 outlines, width-compatible with the Laserwriter Plus, come with the memory upgrade. A version of the Postcard for Ricoh laser engines, and the Postcard Plus for the HP Laserjet, will also be available before the end of the year, said William Lee, product manager at Everex.

Everex is also shipping a family of font cartridges for HP Laserjet-compatible printers. The Hardfont Library includes cartridges that are functionally identical to HP's B, F, and Z cartridges, as well as two special-purpose cartridges for legal printing and spreadsheets. The cartridge prices range from \$160 to \$295.

The company began shipping the OS/2-based Step PCs. The system costs \$2325 and includes drivers for Step-specific hardware. The company will offer future versions of the system, including version 1.1 with Presentation Manager, as they become available from Microsoft.

Everex Systems, 48431 Millmont Drive, Fremont, CA 94538; (415)498-1111.

Page, Next's vice president of hardware engineering.

Still, Page is optimistic about the future of M-O drives. "I think it will cut into the hard disk and tape subsystem markets and, over the next two or three years, I believe people will come to expect optical drives on computers," he said.

Stephen Burke, manager of corporate communications for Sony Corp. of America, agreed that erasable optical drives will probably cut into hard disk and tape drive markets. Despite his other advantages, he said, M-O has one major disadvantage: the media's visual immunity to static magnetic fields and there is no contact with the read/write mechanism, "so there are no head crashes."

What will vendors of traditional storage systems do? "If we see [erasable optical] getting into our price range, we'll move very quickly to acquire the technology to compete," said Irwin Magnetics' Kinney.

PROBITIVE COST. One thing that may slow acceptance of the new technology is the cost of the media, which ranges from \$50 per disk from Next to \$250 from Maxtor and Sony.

"I think people hurt themselves by not providing a lower price for the media," said Rich

Magnetics' Kinney.

INFOPOWER

Continued From Page 23

Optical

Continued From Page 23

entirely possible erasable optical drives could displace the portion of the CD ROM market that needs timely data in small quantities," he added.

"[Erasable optical drives] could replace some Winchester limits," said Al Hebert, manager of product marketing for Canon's drive. But he questioned whether there would be any impact on CD ROM vendors. "The special advantage of CD ROM has been the low price," he added.

PROBITIVE COST. One thing that may slow acceptance of the new technology is the cost of the media, which ranges from \$50 per disk from Next to \$250 from Maxtor and Sony.

"I think people hurt themselves by not providing a lower price for the media," said Rich

Conographic Chip Will Support PDL Printers

BY MARK BROWNSTEIN

Development of a computer chip designed specifically to support the processing requirements of page description languages (PDLs) used for desktop publishing will be announced at next month's Comdex by Conographic Corp.

The computer chip will drive both printers and displays, allowing users to see an accurate representation of printer output on screen before printing, according to the company.

The company is currently developing the chip and is anticipating delivery in the third quarter of 1989. The chip will be the first of its kind, Luis Villalobos, president of Conographic said.

"There are a lot of good graphics chips out there," but none of the chips are capable of performing the specific processing required to convert page descriptions (such as Postscript commands) into printer control codes, Villalobos said.

The chip will be based partially on the logic used in Conographic's Conodesk 6000 printer controller card, which the company says has been certified Postscript compatible by an independent certification laboratory.

As a parallel processor, the

chip can operate independently of a main processor on the board, resulting in faster operation than boards using serial processing.

The company's current board can print pages of Postscript graphics at roughly the speed of current printer engines. Boards that use the new chip should be able to achieve the performance needed for large-page printer engines, Villalobos said.

In addition, the chip can be used to display actual Postscript graphics onto standard or specialized monitors, according to the company. The user will be able to see, within the limits of monitor resolution, exactly what will be printed. This is possible because the Conographic design uses the same board to produce code to drive the printer engine and the signal to be displayed on a monitor.

The computer chip is currently being designed by Conographic and will be made available to board makers, in addition to its use in future Conographic products, according to Villalobos. No estimate of the price of the chip was available at press time.

Conographic Corp., 16802 Aston, Irvine, CA 92714; (714) 474-1188.

AMD's Laser Printer Controller Chips Speed Performance and Lower Cost

BY BOB PONTING

Advanced Micro Devices Inc. is releasing a pair of chips that will lead to faster laser printers for users and cheaper-to-produce machines for manufacturers.

The Am59C75 Raster Printer Controller (RPC) and Am59C76 Orthogonal Rotation Processor (ORP) are CMOS chips that can be used individually or together and will ship to original equipment manufacturers next month.

The RPC provides bit-block-transfer functions, refreshes page memory, and serializes and sends the page buffer contents to the printers.

The RPC can also print black-on-white or white-on-black, fill characters with stored patterns, and merge text and graphics with background patterns.

The chip's maximum throughput is 45 pages per minute at 300 dpi or 25 pages per minute at 400 dpi, but the effective print speed depends on the speed of the controller CPU and the page complexity, the company said.

The ORP rotates character bit maps to 90, 180, and 270 degrees. It is designed to save internal font memory by provid-

ing on-the-fly rotation for landscape and two-sided printing. The ORP can rotate character bit maps as large as 64 by 64 pixels.

Quantities of 100, the RPCs cost \$35 each and the ORPs \$12.65 each.

Owners of Okidata Microline Printers Get Free Retrofit

Owners of the Okidata Microline 320 and 321 qualify for a free retrofit to the printers. According to Okidata senior vice president Dennis P. Flanagan, "if the printers are left on... for a long period there is a potential for excessive heat build-up, a possibility of smoke, and a remote chance of fire."

Users who own these printers are to get the retrofit performed by the reseller from whom they got the printer, said Flanagan's October 10 letter. The memo to distributors states the probability of danger is extremely low.

Okidata, 532 Fellowship Road, Mount Laurel, NJ 08054, (609) 235-2600.

—Jeff Angus

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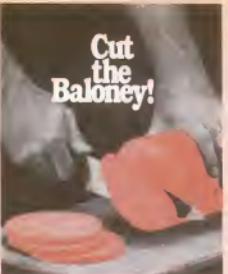
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A common practice is to run processors out of spec. 16MHz 386's pumped up to 20MHz. New 20MHz 296's with only 16MHz processors. The chip maker doesn't sanction it. But that doesn't stop the Baloney Merchants.

AND... if you think you can buy a cheap 25MHz 386 system, think again. Odds are you'll get a 20MHz processor. The 25 MHz Intel chip alone carries a huge price. Besides being scarce.

Don't buy a system running out of spec! Unless you want to risk parity errors and unexpected network, software and other incompatibility problems.

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If you're waiting for some new "miracle" bus design before you buy—go get an abacus. The current bus will be the standard for a long time. And when one comes along that makes sense, Northgate will have it.

CUT THE HARD DRIVE BALONEY:

Northgate popularized 1:1 interleaving and RLL encoded hard drives for peak system throughput performance. Now it's common to see put performance claims on the low, low cost systems.

So buy a Northgate system. The motherboard accepts the 1:1 instruction only sometimes. Overall performance is just minimally increased if at all. Only Northgate explains how throughput depends on using drive format factors other than MFM. Buy an MFM drive with 1:1 interleaving and you're wasting money BUYING BALONEY.

CUT THE BENCHMARK BALONEY:

First, the much-publicized "Speedbar." Forget it! For high-performance system benchmarking, it's worthless. Too easy to trick. The results it shows are meaningless.

Then good Norton SI. There are many Norton SIs. None of them gives useful relative performance measures on high speed computers. When you see Norton SI in ads, ask which version.

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NORTHGATE 386/20SM includes: 1MB RAM; 20MHz Intel Processor; Power Case (for desktop case add \$200.00); One 1.2 MB Floppy; One 1.44 MB Floppy; 65MB RLL 28MS Hard Drive with 1:1 Interleave; 16-Bit Controller; 14-inch High-Resolution FlatScreen Monitor; OmnipKey102; VOP7; Disk Cache Software; Disk Cache Optimizer; Disk Cache Software.

PRICE FOR ABOVE SYSTEM \$3,899.00

NORTHGATE 386/20SM includes: 1MB RAM; 20MHz Harris Processor; Desktop Case; One 1.2MB Floppy; One 1.44MB Floppy; 65MB RLL 28MS Hard Drive with 1:1 Interleave; 16-Bit Controller; 14-inch High-Resolution FlatScreen Amber or Paper White Monitor; OmnipKey102; VOP7; Disk Cache Optimizer; Disk Cache Software.

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...another Northgate system is second to none. We understand how to design a system to give you maximum throughput. Using specially manufactured and modified components—controllers, bus software, memory—Northgate gives you maximum performance—800,000 bytes per second or more.

Northgate's 80386SM can hardly compare to the 386/20SM in terms of the number of options available on their systems. So why put out good money for ordinary performance? Northgate can get Northgate optimized performance for the same or less cost.

VGA, VIDEO TWICE AS FAST AS MOST OTHERS... Again, optimized performance from Northgate. And we don't even bother with 16MHz 386—we've gone right past EGA straight to 16-bit VGA as

standard—not 8-bit as most others. And we've got twice as much resolution as standard monochrome. For comparison, Dell's new System 220 VGA has only 1024x768. And all monochrome is 640x400.

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Northgate Options Prices

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MS-DOS 4.0 with GWBASIC		805.00	805.00
MS-DOS 3.3 with GWBASIC		755.00	755.00
Other Options Include Streaming Tape Backup, Hard Drives to 720MB, VCA and Decoder, Publishing/CAD Monitors to 37 inch, Novell ELS Complete Network Systems and Software.			

computer shopping, ask for results of these tests. At least they're consistent and hard to "fiddle."

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CUT THE VGA BALONEY!

If the ad's not say 16-bit VGA, you're getting only 8-bit performance. 16-bit VGA costs lots more. So a cheap price on a VGA system means you're not getting full value for your money. It's like Xerox paper. You get 8-bit VGA just as fast as a true 16-bit board.

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Only Northgate provides OmniKey, the keyboard expert agrees is the finest ever created. Others boast "clicky" keyboards but none have the intelligent, high production layout of Omnikey.

Ask what their keyboard weighs. Isn't it all plastic? Warranty? Northgate thinks enough of its customers to bring you Omnikey to

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At Northgate, we can't "sell" you a thing. We can only help you get what you want. And that's the job of our account managers. Discover how much our people know about computers and can truthfully help you get what you want and need. No over-selling baloney here!

We can even give you names of Northgate owners in your immediate area so you can find out for yourself why our customers are so enthusiastic.

Then call the other guys and ask the same kind of tough questions you ask us.

CUT THE TECH SUPPORT BALONEY:

Tech Support is integral to the computer business. Whether it's a failed part...a user unfamiliar with configuring a peripheral...software installation.

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Northgate was first to guarantee shipment of user replaceable parts—

OVERNIGHT AT OUR EXPENSE—without first receiving the failed part. Result: Downtime is reduced to one day.

Many others require you to return the part first. Then you face days or weeks of not being able to use your computer. Many companies won't send parts to you at all. You must ship back the whole machine. Costly, inconvenient, time wasting.

Just as important is the warranty period. How long is it? Most ads will see the like "manufacture's warranty applies" in many. That means if the manufacturer put a one-year warranty on the part, but it sat around a distributor's for a few months before being sold to you, source, guess how much life is left on the warranty.

Northgate warranties all parts for one full year. Should the system need to be repaired, send it free, and we warranty every part of the system: disk drives, hard drive, monitors, etc.

CUT THE LOWBALL PRICING BALONEY:

Northgate prices its products as complete systems. We do it that way to assure you the best possible value for your computer investment.

From experience we know the components we include are those

you'll end up buying sooner or later. By including them in a Northgate system, we can save you the money, the work and the confusion of adding a part later.

Many in our business advertise prices for only partial systems to look more competitive. Less RAM than you know you need. A hard drive so tiny it's laughable. An out-of-date monitor.

And while the price for the system may catch your eye, just try upgrading. You can't add to that's where they get you. One highly-touted company has the nerve to charge \$1,000 per meg of RAM (true costs are only about \$500). Such an "upgrade" is part of the Baloney.

YES, BALONEY ABOUNDS.

And we can't cover all of it in this ad. Northgate plans to include a continuing "No Baloney" section in all future ads. We'll update the current scene as we see it.

Maybe you agree with us. Maybe not. But if you think what you think is "baloney" in anything you publish, we'd like to hear from you. Write our Baloney Control manager, Sonja Held.

All we're saying is "get straight facts before you buy." If you don't agree that's good advice, go ahead and buy the Baloney.

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Realistically priced, and featuring a broad selection of drives and video displays, 286/20SM has a new Northgate feature no other system in the industry can offer...

INTRODUCING..."LIGHTNING ALLEY"
All Northgate 286 systems are designed with a slot for extended memory we call "Lightning Alley." And it's a part of our exclusive design for our 286 systems.

Simply stated, "Lightning Alley" lets you add a RAM card that runs at processor speed, not bus speed. No other system we know of does this. They all run at bus speed, 8 or 10MHz.

"Lightning Alley" boosts extended memory functions up to twice the performance—or more—of any other system. So if you're using extended memory in your system as a file server, for Xenix, AutoCAD, OS/2, Windows, you'll see your programs

really fly! You'll see the same difference as when you went from XT to AT.

YOU KNOW IT'S QUALITY FROM THE START...

When your Northgate system arrives, you'll know at once you've purchased quality. It arrives in a carton that could safely ship eggs. Unpack your Northgate, plug it together and turn it on. You'll be dazzled by the VOPT program that comes up every time to make sure your hard drive remains optimized.

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ALL THE SAME FEATURES AS OUR 386/20SM...

Check all the features we've listed here. They cover both our 386 and 286 systems, and all add up to the most advanced computers ever offered to get your work done faster.

Then check Northgate's unique service policy, our quality reputation and our pricing.

You simply can't find a system at the price that out-performs Northgate.



all offer the following advanced features:

gate offers it today! Our SCSI model has an SCSI host adapter. Connect as many as 7 intelligent devices—hard drives, tape backups that can run in background, optical laser discs, etc.

Now SCSI technology no longer costs a fortune. Check our prices for SCSI with 40MB hard drive, Performance SCSI tape backup, SCSI—under 18 Millisecond access speeds. Ideal for intensive data base applications and loading your spreadsheet in a blink.

Check the prices below and phone for more details on our SCSI system. You'll find it can put more zip in your system performance at a price that's more than pays for itself!

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(Cf. Yes, if you don't buy Northgate's system and still want to buy Omnikey, you can buy it separately for \$99.00. See our ad.)

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Compare with the other guys. Then call Northgate and feel confident you're buying the best!

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Ideassociates Rolls Out MCA Memory Board

BY ED SCANNELL

BILLERICA, MA — Ideassociates Inc. last week rolled out an 8-megabyte memory expansion board designed specifically to take advantage of the Micro Channel Architecture used in IBM's Personal System/2 Models 70 and 80.

Christened Ideamax 80, the board has a dynamic wait-state design that allows it to operate in any Model 70 or 80 — including the Model 70-A21, which operates at 25 MHz.

The new board uses Ideassociates' On-board Memory Checking Diagnostic Scheme (OMCDS), which reportedly



The Ideamax 80 is a 32-bit MCA expansion board which offers up to 8 megabytes of expanded memory for the IBM Models 70 and 80.

offers high levels of reliability. For instance, when a memory module fails in a traditional memory board, it breaks down and must be removed.

But with the Ideamax 80, the board continues operating because OMCDS disables the bank of modules where the failure occurred, a spokesman said.

Users can incorporate any combination of extended or expanded memory

using the board, which offers up to 8 megabytes of memory using 1-megabyte SIMMs and up to 2 megabytes using 256K SIMMs.

Because the modules are mounted horizontally on the board's surface, they need less space than more conventional chips, the company said. Both 256K and 1-megabyte random-access memory chips can be used on the same board.

Also, Ideamax can use 100- and 120-nanosecond memory modules as well as 80- and 85-nanosecond modules.

Ideassociates officials claim the board can be installed "seconds" due to the use of on-board read-only memory, which automatically detects the amount of memory both in the system and on the board.

Ideamax 80 includes a RAM disk driver and a print spool program to increase productivity.

The suggested retail price of the board is \$495 without memory and will be available by the end of November.

Ideassociates Inc., 29 Dunham Road, Billerica, MA 01821; (508) 663-6878.

Dell Upgrades 386-Based PC, Raises Prices

Dell Computer Corp. announced last week it has upgraded its high-end 80386-based machine to offer more memory and a 16-bit video graphics adapter.

The 20-MHz Dell System 310 is now available in four standard models, up from the lone standard, 1-megabyte model. The machine now also comes in 4-, 8-, and 16-megabyte models. All have standard a new 16-bit VGA graphics adapter that improves video performance, instead of the 8-bit VGA adapter used in the earlier model, said Brian Fawkes, representative of the Austin, Texas-based direct mail-order manufacturer.

Customer demand for higher-performance machines led Dell to offer machines with more memory and faster graphics, Fawkes said.

The System 310 comes with 4 megabytes of memory, a 40-megabyte hard drive, and a 16-bit VGA Color monitor, and costs \$6,399, up from \$4,299 for the 1-megabyte RAM, 8-bit VGA monitor model that was standard in May. The 4-megabyte model with a 32-megabyte hard disk and VGA Color Plus monitor is now \$7,399, up from \$7,399.

Dell Computer Corp., 9505 Arboretum Blvd., Austin, TX 78759; (800) 426-5150.

— Paula S. Stone

Quadram Enhanced I/O Expansion Board for AT Uses Bus Speeds in the 8- to 10-MHz Range

Quadram Corp. recently announced the Quadport AT+, an I/O expansion board for the PC AT and compatibles that uses bus speeds in the 8- to 10-MHz range.

This enhanced version of the Quadport AT offers a parallel port and five serial ports. All ports are handled on the board. No daughterboards are required.

It is compatible with all versions of DOS and takes advantage of the capabil-

ity of DOS 3.0 and later versions to recognize more than two serial ports.

Quadport AT+ will be available in December for less than \$500, Quadram said. The Quadport AT, equipped with one serial and parallel port, will continue to be sold. It will remain priced at \$185.

Quadram Corp., Quad Way, Norcross, GA 30093; (404) 923-5666.

— Robert Snowden Jones

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TECH TALK ■ By STEVE GIBSON

Clear, Legible Images on Ventura with Bitstream's Fontware

This week we'll finish our study of the state of the art in IBM video display technology by looking up a variety of loose ends. As we've seen, my display adapter of choice is Paradise's 8-bit VGA Plus. Surprisingly, the architecture of the PVGA1 chip, which forms the heart of every VGA adapter from Paradise as well as the VGA systems produced by AST Research and Compaq, minus nothing from a 16-bit bus connection, when the boards are used in their high-resolution bit-mapped modes. This means that except for the additional memory on the Paradise VGA Pro board, there's absolutely no benefit in purchasing it over the less expensive 8-bit Paradise Plus. In fact, the temptation would then be to run the Pro board in its 256-color mode, but my benchmarks revealed that display performance suffers with higher color counts. This is hardly surprising since additional colors depend upon the use of additional memory which must be managed by the driving software.

After declaring the Sony "Multisan" CDP-1302A to be today's ultimate video display, I was contacted by many competing vendors who wanted me to believe that their displays were better. As a result of entertaining several such possibilities, I'm more certain now than ever that the Sony wins everything else away.

As I acquire increasing experience with 800-by-600 resolution (which you get "free" when the Sony is paired with the Paradise VGA Plus), I'm becoming more certain that it's ultimately the best general purpose resolution. When running at 800-by-600 resolution, the Sony produces an active image area which is 10 inches wide by 7.5 inches tall. Dividing each of these lengths into the pixel resolution in that dimension yields exactly 80 pixels per inch in each direction. This beats the Macintosh's 72-pi resolution with a much larger screen while delivering the Macintosh's popular "square" pixels which are exactly as wide as they are tall. It's nice to have a system on which circles appear circular and squares really are square.

While I'm thinking about high resolution under Microsoft Windows, Micrograph's incredible Designer product feels to me like a highly evolved CAD package with an exquisite state-of-the-art Windows user interface. Using Designer has become fast and reflexive. It has that rare easy-to-learn feeling which results from several generations of detail polishing. While Designer completely answers my desire for the lightning-fast creation of structured graphics, I've been surprised and delighted to find that several of my dyed-in-the-wool, traditional "CAD freak" friends have completely switched to Designer. I mean, if the mouse my way around it. If you have any need for PC-based drawing, I'd urge you to take a peek at Micrograph's Designer.

I'm addicted to Ventura Publisher for the creation of all manner of high-grade hard copy, so the quality and legibility of Ventura's displayed image has profound importance to me. I've therefore been lured by Ventura's three fixed-display screen-zoom factors. At each zoom set-

ting the image is always either too small, leaving an unused "gray zone" to the right of the page[®] image, or too large, requiring a horizontal scroll to see everything.

Bitstream, Inc., has developed and sells a fabulous technology called Fontware which generates any size and resolution of ultra-high-quality typefaces from a set of sophisticated typeface outline masters. Since the EGA's pixels aren't square, the EGA-compatible screen fonts which are

shipped with Ventura aren't specifically tailored for 800-by-600 resolution. So I decided to use Bitstream's Fontware to regenerate an entirely new set of Ventura screen fonts with one pixel and margins exactly fills the screen. Ventura's "normal" viewing mode with Ventura's mode selection icon displayed. The result is an incredibly clear and legible image in 800-by-600 resolution which puts the VGA's de facto 640-by-480

image to shame.

stream's Fontware technology to rebuild Ventura's screen fonts at 100-by-100-pixel resolution, the text of a standard 5.5-by-1.1-inch page with one line margin exactly fills the screen. Ventura's mode selection icon displayed. The result is an incredibly clear and legible image in 800-by-600 resolution which puts the VGA's de facto 640-by-480 image to shame.



KURTA out-thinks ordinary tablets.

I only looks like a tablet.

If you have been toying with the idea of getting a graphics tablet or digitizer stop toying instead, get a total computer "Input System." The Kurta IS/ONE[®] Kurta turns your CAD, CAM, and CAF workstations into workhorses. For starters, you get a Kurta computer input tablet which interfaces with

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drawing to menu picking. Or switch from application to application just as fast. All at the touch of an IS/ONE sofkey! No ordinary tablet lets you switch like this, back and forth "on-the-fly" at will. Kurta eliminates hundreds of keystrokes. This benefit alone is reported by users to double productivity.

Cordless cursors and pens with no equal.

Kurta offers the only cordless 4-button cursor and only cordless 3-switch pen. There are six Kurta pointing devices in all, including the new Kurta 12-button cursor for maxi-

mum application control with instant touch.

Built-in software with standards like ADI.

Only Kurta ships a software driver in every package that makes more than 98% of all software Kurta-compatible. For DOS applications, Kurta's IS/PENSMITH[®] driver supports the industry-standard Microsoft Mouse Driver and AutoCAD ADI[™] (Autodesk Device Interface)

Driver Kurta's IS/PENSMITH is for IBM, and compatibles. IS/PENWORKS[®] for Apple and Mac. IS/PENCRFT[®] for Amiga. All feature Kurta's "dynamic scaling" to miniaturize/maximize

	Scanning	Graphics	Color	Color	Color	KURTA
Personalized Macro Area	No	No				Up to 16 programmable Softkeys
Templates	3rd Party	No				Mac/CP/M, VMS/CAL, Windows [®] , PenPak [®] & Color
Curves, Fitting Devices	No	No				3-5 switch Pen & 4 button Cursor
Memory	256	32K	32K	32K	32K	Lifetime

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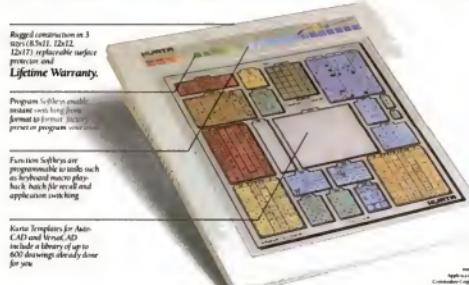
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Steve Gibson is the developer and publisher of Spin Rite and president of Gibson Research Corp. of Irvine, California. The views expressed are his own.



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*PC Magazine's "Editor's Choice" on October 13, 1987



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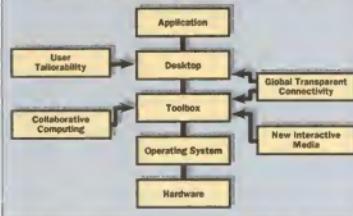
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MACINTOSH NEWS

The Macintosh Architecture Model



Apple Computer's five-layer architecture model is the basis for explaining how the Macintosh platform will evolve.

TECHNOLOGY UPDATE

Apple Looks to Mac Oasis To Bring it Into the Future

Apple Works to Extend the Mac Architecture

BY NICK ARNETT

As Apple Computer Inc.'s advanced technology group works to extend the Mac in new media, group computing, connectivity, and user programmability, the company is counting on the existing Mac architecture to continue as its underpinning.

The five-layer architecture first came to light last spring under its former code name, Oasis. Since then, Apple has used the model as the basis for explaining how new products fit into the existing ones, as well as to argue the Mac's strengths compared to IBM's SAA strategy, which includes OS/2.

MAC BETTER? "When we explain our system in terms of this model, customers look at it and look at like things such as OS/2 and Presentation Manager and

understand clearly why the Mac is better," said Chris Espinosa, product marketing manager in Apple's advanced technology group.

Apple's recent introduction of the Mac IIx, essentially a Mac II with a Motorola 68030 microprocessor, was an improvement at the lowest level of the model. The 68030's data and instruction caches, as well as its onboard memory management unit, improve the machine's processing speed and capability to run multiple tasks under future operating systems, according to Apple officials.

One level up is the Mac operating system. Through improvements in the operating system, Apple intends "to improve existing applications and accelerate the development of whole new classes of applications," Espinosa said.

See Oasis, Page 34

Accelerator II From Daystar Speeds up the Macintosh II

BY LAURIE FLYNN

Daystar Digital demonstrated recently a 33-MHz accelerator board for the Mac II that Daystar claims doubles the speed of the computer.

The product, based on the Motorola 68030 and called the 33/30 Accelerator II, connects to the motherboard of the Mac II and uses the original 68020 socket rather than an add-in slot, according to Andrew Lewis, president of Daystar Digital. When installed as a NuBus card, the accelerator is hampered by the 10-MHz speed of the slot, he said.

The 33/30 product features a memory-caching process that uses 32K of 25-nanosecond static memory.

This 33/30 will be available in December for \$6,000. An optional 68882 floating-point processor will cost \$1,000. The card also supports the Mac's original 68881 coprocessor.

Daystar also offers a line of 68020-based accelerators and memory upgrades. In addition, the company acquired Tangent Technology's line of IBM PC Appletalk networking products.

Daystar Digital, 5565 Atlanta Highway, Flowery Branch, GA 30542; (404) 967-2077.

Avatar Adds DFT Support for Mac

Mac Mainframe II Lets Users Log Onto Multiple Hosts Concurrently

BY LAURIE FLYNN

Avatar Corp. has added Distributed Function Terminal (DFT) support to its Mac Mainframe II communications product, enabling users to run up to five mainframe sessions simultaneously, the company announced.

With the new feature, Mac II users can log onto multiple hosts concurrently in separate windows. DFT support is already widely available to users of IBM

PC-to-host communications products, according to Rosemary Clinton, Avatar manager of marketing and communications.

"The ability to run multiple sessions on one Mac simultaneously is something power users have always desired, but that has typically not been available for the Macintosh as far as mainframe communications are concerned," according to Joyce Enos, Mac Mainframe product manager.

With Apple's MultiFinder, users can also run Mac applications at the same time, cutting and pasting between programs and host sessions.

The company also improved point-size selection and keyboard help-screens, the company said.

Mac Mainframe II/DFT is priced at \$1,295. Current users can upgrade for \$495.

Avatar Corp., 99 South St., Hopkinton, MA 01748; (508) 435-6872.

IDD Plans to Ship CAD Program With Range of Tools

BY LAURIE FLYNN

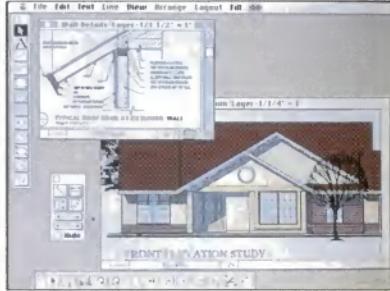
Innovative Data Design (IDD) Inc. plans to ship in November a mid-level color CAD program intended for both engineers and graphic design professionals.

The program, called Dreams, incorporates object-oriented shape tools, which can be accessed from floating palettes that are always active, the company said. The program supports drawing sizes of up to 8 square feet, with easy access to all parts of the document.

Pop-up menus include options for configuring tools. "We only present the appropriate choice," said IDD president Paul King. The program's available palettes include draft, accept, copy, and dimension.

Dreams' range of tools includes support for Bezier curves, spine curves, parallel lines, and fast rotating and dimensioning. The program supports zooming and has a magnification of up to 32 times.

Users can access up to 256 colors per drawing and create their own colors and palettes. The program also supports gray-



IDD's Dreams program offers object-oriented shape tools accessible from floating palettes that are always active.

scale output.

"For all design-related markets, Dreams offers a powerful drafting environment that lets designers concentrate more on design and less on mechanics," said King.

Dreams is priced at \$500 and runs on the entire line of Macs. IDD also offers Mac Draft, which began shipping for the Macintosh in 1985. The price of Mac Draft remains \$269. Current users of Mac Draft can upgrade to Dreams for \$200.

Dreams will join the Mac-

intosh market for sophisticated CAD software with Verscad and Archimedes. Generic Software is also planning mid- and high-end CAD software for the Mac.

IDD plans to release a series of palettes, the first of which will be available for engineering professionals in early 1989. Architectural symbol libraries are also in the works for a variety of vertical markets.

Innovative Data Design Inc., 2280 Bates Ave., Suite A, Concord, CA 94520; (415) 680-6818.

Irwin Offers Excelerator Board for Mac

BY MARK BROWNSTEIN

Irwin Magnetics, a company that has made its reputation with streaming tape backup devices, this month entered the Macintosh enhancement product area with three accelerator boards and two large screen monitors.

The Excelerator boards are said to boost the performance of Macintosh SE computers by up to eight times. The XL board replaces the Mac's 8-MHz processor with a 16-MHz 68000 processor chip. It also provides

32K of high speed static RAM with zero wait states.

The XL20 replaces the 8-MHz 68000 chip with a 20-MHz 68020 processor, while the XL25 makes the replacement with a 25-MHz 68020 chip.

The 19-inch Powerview monochrome monitor, designed for systems with an XL board, features 1024x720x890 resolution and is shipped with an accelerated graphics controller. The Powerview XL includes the monochrome monitor and a graphics controller for use with the XL, XL20, or XL25 boards.

Software shipped with the monitors allows the user to select display options, including big screen only, both screens, and image magnification.

All products are now shipping, according to sources at Irwin. The XL board has a list price of \$499. The XL20 is priced at \$999, and the XL25 is selling for \$1,699. The Powerview package sells for \$1,999, while the Powerview XL package will sell for \$2,399.

Irwin Magnetics, 2101 Commonwealth Blvd., Ann Arbor, MI 48106; (313) 930-9000.

Oasis

Continued From Page 33

One example of this might be Apple's announced, but not yet delivered, 32-bit color software for the Mac II. Apple officials have given vague descriptions of an upcoming 32-bit system software package that sources close to the company said will replace Multifinder with multitasking that relies on the hardware memory management for better performance.

Apple also is reported to be developing a graphics model that can be used for the

display and its printers, akin to Adobe Systems Inc.'s Postscript and Display Postscript.

At the next level, the Toolbox, Apple hopes to offer tools for animation, voice input and output, and 3-D graphics, enabling support of "new interactive media," according to Espinosa and other Apple officials. Apple is also adding communications tools, such as the recent announcement of support for TCP/IP and development of the connectivity language, CL/I, in its quest to achieve "global transparent connectivity" and simplify collaborative computing.

SEE HOW IT FITS. "One of the problems as

the Macintosh system has grown is that there is so much stuff that when we introduce new products like CL/I, it's hard for people to see how that fits," Espinosa said.

Those tools, similar to the graphics and other routines stored in the Macintosh's read-only memory, will be directly available to software developers to make them simpler to implement and better performers than if they had to be programmed.

At the desktop level, Apple officials like to compare the machine to the dashboard of a car — but reconfigurable, to meet the company's goal of "user tailorability."

Vendors Ready Product Debuts For Mac Show

BY LAURIE FLYNN

ANAHEIM, CA — The opening of the Macintosh Business Conference and Exposition here this week is expected to draw as many as 10,000 corporate attendees and set the stage for a slew of product announcements.

The show will also mark the first meeting of the Apple Professional Exchange, a user group formed earlier this year for corporate Macintosh users and vendors. The new group, formerly known as the National Apple Professional Information Exchange, currently has about 100 corporate members, according to Dash Chang, president of Chang Labs, of San Jose, California, and one of the group's founding members.

Among those companies unveiling new products is Mirror Technologies of Roseville, Minnesota, which will show the Visionscan II scanner and several storage devices. The Shadow line of external drives is available in capacities ranging from 30 to 140 megabytes and offer 19-millisecond access times. The Shadow RM20 is a removable storage device using 20-megabyte disks, according to the company.

Survivor Software Ltd. of Inglewood, California, will announce the Macmoney Invoicer, an add-on module for the company's Macmoney financial management program. The program will be available in the first quarter of 1989 for between \$50 and \$80, the company said.

Tri-Data Systems Inc. of Sunnyvale, California, will announce shipment of a IBM 3278 printer emulation program and support of multiple Appletalk zones for its Netway 1000 gateway.

NEWS BRIEFS

RADIUS EXTENDS WARRANTIES

Radius Inc. has extended the warranty on its line of displays and accelerators from 90 days to one year, the company announced.

The new warranty covers all products purchased since July 1, 1988.

Radius Inc., 404 E. Plumeria Drive, San Jose, CA 95134; (408) 434-1010.

ALISA SOFTWARE FOR SQL-NET

Oracle Corp. has announced it will bundle Alisa Systems' TSS-NET DEC-NET Protocol and Net Control Software with its Macintosh database software.

The addition of the Alisa software to Oracle's SQL-NET will allow Mac users easier access to DEC databases, the companies said. "Now that Oracle is including it in their package, the user can plug and play," said Alisa president Bob Denny.

The DEC-NET protocol software is part of Alisa Systems' TSS-NET product, which sells for \$495 per Mac. Users requiring mail-and-file-sharing features can still purchase that program from Alisa.

Oracle Corp., 20 Davis Drive, Belmont, CA 40002; (415) 598-8000.

Alisa Systems Corp., 221 E. Walnut St., Suite 175, Pasadena, CA 91101; (818) 792-9474.

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†Mouse or LCD display available.

UNIX NEWS

BiiN Unveils Its First Two Unix Systems

Special Architecture Allows New Features

BY MARTIN MARSHALL

BiiN Inc., a joint venture of Intel and Siemens corporations, last week unveiled its first two systems, called the BiiN 20 and the BiiN 60. The BiiN 60 is a high-end system that processes up to 44 million instructions per second and supports up to 1,000 terminals. The BiiN 20 is aimed at departmental computing, and the system supports up to 50 users with each of its 5-MIPS processors.

The BiiN system is totally new from the ground up, starting from its proprietary chip set, through its 40-megabyte-per-second bus structure, up to its proprietary BiiN/OS operating environment. It gains the title of a Unix system only from a shell built into the BiiN/OS that makes it appear to the world like a Unix System V.3-compatible system.

"The BiiN systems are System V.3 SVID and IEEE POSIX compatible," said BiiN spokesman Wes Melling. "It takes no more time to port Unix applications to them than to any other System V.3 system. Ingres, for example, was ported in 15 days, QuadraView in four days, and AutoCAD in 1½ hours," Melling added.

The BiiN/OS achieves many features that would be very difficult to implement in Unix, Melling said. These include

symmetric multiprocessing, a deep level of built-in security features, and fault tolerance. All of these aspects of the system are especially emphasized by the BiiN architecture.

At the core of the architecture are four chips — the CPU chip, a channel processor chip, a bus controller chip, and a memory control chip. The 5.5-MIPS CPU chip is an elaboration of Intel's 80960 processor, but, according to Welling, with much additional circuitry required to do object addressing in hardware. "Doing this inside the VLSI has major security and fault-tolerance implications," said Welling.

According to Welling, the 6-MIPS channel processor chip is more important for the BiiN system performance than the CPU chip. "We have achieved about the logic level and bandwidth of mainframe I/O channel processors," Welling said. "In mission-critical applications, you need I/O processing more than you need CPU power," he added.

To achieve symmetric multiprocessing, each CPU implements low-level scheduling functions based upon parameters set by the high-level BiiN/OS scheduler. Interprocess synchronization and communication are integrated with the processor scheduling, so that one processor can block a process and



BiiN 20: Security, fault-tolerant and multiprocessing highlight this one- or two-CPU system.

schedule another without intervention from the BiiN/OS. All of the processors in the system share a queue of ready-to-run processes, so that the workload remains balanced.

The BiiN 20 system will be delivered beginning in March, with system prices varying from \$43,000 to \$80,000.

The minimum configuration system, the BiiN 20/10, has one CPU, 16 megabytes of RAM, a 1.80-megabyte hard disk, a 125-megabyte cartridge tape drive, Ethernet 802.3, eight terminals, and six serial communications interfaces.

Bin Inc., 2111 N.E. 25th Ave., Hillsboro, OR 97124-5961; (503) 696-4800.

Unix Shell with Graphical User Interface Planned

BY SCOTT MACE

American Management Systems Inc. has announced Looking Glass, a Unix shell with a graphical user interface that will be made available for a variety of graphical environments.

Looking Glass will offer users several ways to view the Unix file system, including icon-based representations, tree views, and two levels of viewing by name. It also lets users launch applications associated with a file simply by double-clicking on its name or icon.

The company has also announced that the character-based version of its Directory Shell will be distributed by Softsel Computer Products Inc. of Ingleside, California, marking the first entry of a major traditional PC software distributor into the Unix utilities market.

"The market for Directory Shell will continue to grow for a few years, but within five or 10 years dumb terminals will be replaced by graphics terminals that runs with X or an X-like server," said Jay Wetzlauer, senior principal of American Management Systems.

Directory Shell is available

for \$495 for Xenix or Interactive Unix running on 386-based systems. A 286-based version sells for \$349.

Looking Glass, which will be available in March 1989, will require Unix and a windowing system. Support is planned first for X11, and then for Sunview and News, Wetzlauer said. Looking Glass will also support higher-level look-and-feel standards such as DEC-Windows, Open Look, and the Presentation Manager, he said. The company expects to sell Looking Glass for about \$600 on a 386-based system.

Building on technology used in Directory Shell, Looking Glass will allow novice Unix users to manage Unix multitasking and networking functions. A rule-based system will permit Unix file typing, Wetzlauer added.

Both Looking Glass and its user interface toolkit — used for constructing dialog boxes and other interactive displays — have been submitted for consideration to the Open Software Foundation.

American Management Systems Inc., 1777 N. Kent St., Arlington, VA 22209; (703) 841-6021.

Computerland Gets Unix/Xenix Software

BY PAULA S. STONE

Computerland announced plans last week to provide turnkey Xenix solutions for users in response to the growing multi-user market. This makes Computerland the second major national retailer to stock Unix/Xenix software, following Xerox Shack's lead in bringing Xenix to the general marketplace.

At the same time, Computerland announced that its CPA's programming package, dubbed the CPA Series, has been ported to SCO Xenix and will be available on November 15. The CPA Series contains eight accounting modules, and each module is priced at \$995, said Scott Fenimore, president of Data Pro.

Computerland will sell SCO's Xenix/Unix 386, Version 2.3 operating system both separately, as well as bundled for use on Compaq 386-based personal computers.

The installation process will be performed for you by the local Computerland franchise dealers when the purchase of an operating system is bundled with the purchase of a Compaq computer, according to Compu-

terland officials.

Computerland will also make available the entire SCO Xenix/Unix product line to the 105 Computerland dealers who are currently authorized SCO US franchises, while the remaining 300-plus Computerland franchises will act as ordering centers for SCO products.

Computerland plans to offer three bundled SCO/Compaq systems, including entry-level, mid-level, and high-end systems.

The entry-level system is a Compaq 386SX, with 3 megabytes of RAM, a 40-megabyte hard drive, a 40-megabyte tape drive, a four-port Compuport parallel port, and a color VGA monitor. Bundled with SCO Xenix, it will be priced at \$8,851, according to the company.

The mid-level system is a Compaq Despro 386/200 Model 110 and comes with 5 megabytes of RAM, a 110-megabyte hard drive, a 135-megabyte tape drive, an eight-port serial card, and a color VGA monitor. This mid-level Compaq system is priced at \$15,536.

The high-end system, capa-

ble of supporting up to 32 users, uses a 25-MHz Compaq 386/25 Model 300 and comes with 9 megabytes of RAM, a 300-megabyte hard drive, a 135-megabyte tape drive, a VGA color monitor, and a 16-port intelligent serial card. It is priced at \$25,224, according to Computerland.

The product line of SCO applications now includes more than 2,500 programs. The product line will be available for ordering through Computerland stores.

Compaq said that 10 percent of Compaq 386 systems now purchased run multuser software. This includes SCO Xenix, said Lynn Parsons, a Compaq spokesman.

Computerland selected SCO and Compaq products because of their leadership position in their markets, said Jeff Evert, director of products for Computerland Corp.

SCO Xenix is an established product and offers to users a wide range of productivity, networking, communications, and workstation applications, according to Computerland.

Computerland Corp., 30800 Santana St., Hayward, CA 94544; (415) 487-5000.

V.I. Will Link Data Views to Nexpert Object Using New Subroutine Bridge

BY STUART J. JOHNSTON

V.I. Corp. is now shipping a software bridge to link its Data Views dynamic graphics system and Neuron Data's Nexpert expert system shells.

The company also plans to ship in early 1989 an editor construction kit for Data Views.

The Data Views/Nexpert Subroutine Bridge gives users of Data Views 6.0 the capability to create dynamic, interactive graphics links to expert system applications built in Nexpert Object.

The subroutine bridge, which is written in C, gives application developers control over the appearance of menus, text entry windows, and other graphic objects. The expert system's knowledge base can also dynamically control the graphics display. In return, the graphical user interface in Data Views can control rule-based processing in Nexpert Object.

The editor construction kit is a set of support routines in Data Views for users who want to give their applications a tailored editor with graphical object editing. It provides a graphical interface for interactively creating objects and defining their control points as well as giving the programmer control over the appearance of the editor.

V.I. Corp. estimates that the editor construction kit will save application developers six months of development time. The company has not yet set pricing or a list of platforms for the product.

The Data Views/Nexpert Subroutine Bridge costs \$1,700 and is available for Apollo and Sun workstations, DEC VAX stations under VMS, Microvax computers with GPX, and Hewlett-Packard's 9000 family of Series 300 Unix workstations.

V.I. Corp., Amherst Research Park, Amherst, MA 01002; (413) 253-3482.

INDUSTRY

EGGHEAD SOFTWARE SALES

Databases/DOS

Product	Vendor
1 Database III Plus 1.1	Ashton-Tate
2 Paradox	Borland International Inc.
3 Rbase for DOS 2.1	Microrim
4 Q&A Database 3.0	Symantec Corp.
5 Reflex	Borland International Inc.
6 PC-File Plus 2.0	Buttonware
7 R&R 3.0	Concentric
8 PFS Professional File	Software Publishing Corp.
9 Dataease, Release 3, 2.5	Dataease International
10 Foxbase Plus 2.10	Fox Software

Graphics/DOS

Product	Vendor
1 Harvard Graphics	Software Publishing Corp.
2 Freelance Plus	Lotus Development Corp.
3 Gem 3 Draw Plus 2.0	Digital Research
4 Graphwriter II	Lotus Development Corp.
5 Diagraph 4.0	Computer Support Corp.
6 Micrografx Design 1.2	Micrografx
7 Picture Perfect 4.0	Computer Support Corp.
8 Chartmaster Premium Pak 6.21	Ashton-Tate
9 Window Graph Plus	Micrografx
10 Timeline Graphics 1.1	Symantec Corp.

SOURCE: EGGHEAD DISCOUNT SOFTWARE, BASED ON GROSS CORPORATE SALES BETWEEN AUGUST 12 AND SEPTEMBER 12.

Former IBM Exec to Run New Ashton-Tate Division

BY SCOTT MACE

Keeping pace with Lotus Development Corp. and Microsoft Corp., Ashton-Tate has recruited a former IBM executive to run a portion of its applications development operations.

William P. Lyons, most recently vice president of software marketing in IBM's national distribution division (NDD), was appointed president of Ashton-Tate's newly created PC applications division.

Lyons, a 19-year IBM veteran, has already assumed his post and will run the division from Ashton-Tate's Connecticut facilities, where he will oversee word processing, decision support, and presentation graphics products. He will also guide development of future Ashton-Tate DOS and OS/2 products, Lyons said.

The new division marks the completion of a recent restructuring at Ashton-Tate. The company has formed Macintosh applications, PC applications, and publications divisions in addition to its existing database division.

Lyons has worked in the PC area since 1983 when he joined IBM's entry systems division

(ESD), in Boca Raton, Florida. In his five years at ESD, Lyons was also division director of marketing and general manager of personal systems merchandising at NDD.

Earlier this year, former IBM executives Frank King and Michael Maples accepted senior positions at Lotus Development Corp. and Microsoft Corp., respectively.

The two sometimes overlapping software groups in Adapsos have merged into a single software products group.

At a closed board meeting at the Adapsos management conference held in Dallas earlier this month, the microcomputer products section of Adapsos agreed to merge with the software products section immediately, according to Esther Dyson, the editor of the newsletter *Release 1.0* presided over the meeting.

Some microcomputer publishers feared they would be

■ PROFILE

Aldus Exploring New Markets to Build On Desktop Publishing Success Story

BY STUART J. JOHNSTON

A leader in the desktop publishing boom, Aldus Corp. is now targeting new markets in an attempt to maintain its sales expansion while carefully managing its operations.

Aldus' sales grew 255 percent in 1987 to \$39.5 million, earning it a spot among the 10 largest American microcomputer software companies just three years after the company was formed.

"The financial analysts are predicting that this year we'll do somewhere between \$70 and \$75 million," said president and founder Paul Brainerd. That target assumes Aldus' sales will grow 90 percent over its 1987 level. For the first six months of 1988, Aldus grossed \$35 million.

That growth rate reflects the continuing popularity of desktop publishing, an area Aldus pioneered with its PageMaker page layout program for the Mac.

BROADENING PRODUCT BASE. Wary of becoming dependent on a single product for sales, Aldus has strategically looked outside the company to acquire complementary products. Internal development efforts are concentrated on future releases of PageMaker for the Mac and PC.

Can the company keep up the spectacular growth that took it from a studio apartment to a more than 400-employee company in less than five years? Brainerd seems confident it can.

The company is looking to expand into other platforms, such as the Unix-based Sun and Next computers, Brainerd said. He also hinted that a networked multiuser version of PageMaker is under consideration. Another



Aldus founder Paul Brainerd coined the term "desktop publishing."

GOFF MANAGE

area of interest, one that the company entered when it acquired Snapshot, is electronic imaging.

DESKTOP PRESENTATION MARKET.

While the company's fortunes are based on PageMaker, Brainerd feels the desktop presentation market could be as big as desktop publishing, but cautions "there's a lot of competition."

"The challenge is getting to all those people who are generating presentations," Brainerd added.

Observers find it difficult to criticize how Brainerd has managed Aldus, but some believe the desktop presentations market is less of a sure thing than desktop

publishing was.

"I think that's a fantasy," said Jeff Tarter, editor of *Soft-letter*, in Cambridge, Massachusetts. "It's going to be very competitive and there's so little to differentiate the products that I get confused and so do the users."

ELECTRONIC IMAGING. But Tarter believes Aldus is on the right track with its electronic imaging and multiple-platform strategies. "I believe electronic imaging is going to be a very big market in four or five years when scanners will be everywhere," he said. "It was good thinking of Aldus to get a foot in the door even if it doesn't generate revenue for a while."

Tarter said he feels developing a Unix-based wordprocessing product would be a good move for Aldus. "That's where the big money is in that business," Tarter said.

Brainerd's previous experience as a vice president with newspaper publishing system developer Atex Corp. gives him a superior knowledge of workgroup issues, Tarter added.

With PageMaker and other desktop publishing product, Brainerd believes Aldus is bringing the power of the press to individuals. That has been part of his goal for Aldus, which was named after Aldus Manutius, a 15th-century scholar who, with Gutenberg, helped popularize printing and publishing.

"We wanted a company name that reflected human values," Brainerd said.

Adapsos Software Groups Merge

BY RACHEL PARKER

The two sometimes overlapping software groups in Adapsos have merged into a single software products group.

At a closed board meeting at the Adapsos management conference held in Dallas earlier this month, the microcomputer products section of Adapsos agreed to merge with the software products section immediately, according to Esther Dyson, the editor of the newsletter *Release 1.0* presided over the meeting.

Some microcomputer publishers feared they would be

outnumbered by the minicomputer and mainframe publishers — the traditional members of Adapsos. But Dyson maintained that they will actually be part of a stronger unit.

"Now we have a big board," said Dyson, adding that "packaged software is the business of 50 percent of Adapsos' membership, contributing 30 percent of the association's dues."

The merged software group will focus on protecting intellectual property rights in software, virus prevention, technology issues surrounding different platforms, and governmental actions. Issues that are unique to

the PC business, such as distribution and development issues, will continue to be part of the Adapsos program.

The merger of the boards reflects a significant trend in the software market, Dyson said. "The competition will be with [the larger system vendors]."

Although the main boards merged, it is not clear what will happen to the specific committees that each board has created, such as the intellectual property and software protection boards. Those details are expected to be settled by the next Adapsos management meeting, which will be held in the spring.



STATE OF THE INDUSTRY ■ BY RACHEL PARKER

Publishers Walk Tightrope Between Direct Sales, Resellers

The first battle in the minicomputer/microcomputer war will not take place on the desktop but in the distribution channels.

For nearly two years, PC software publishers like Ashton-Tate and Lotus have been making noise about moving their applications up the corporate ranks — offering the power of traditional MIS packages on more powerful PCs. The guys who have made millions selling packaged software through resellers are telling us that they'll provide minicomputer and even mainframe versions of their popular packages.

At the same time, minicomputer vendors such as Oracle and RTI have hungrily eyed the fast-growing PC software market. With the PC gaining power and speed, minicomputer publishers reason that these systems will be able to run their software at the desktop.

While publishers scout each others' markets and ready products, though, another issue is rearing a troublesome head: distribution.

PC publishers have struggled to get and maintain good relationships with both distributors and resellers. It is a kind of love/hate relationship, with both the vendors and resellers needing each other to make money but resenting the degree to which the other eats into his profits.

Selling to corporate America is an especially prickly thorn for both publishers and resellers. Trying to ease the purchase of hundreds of copies of software, publishers have flirted with the notion of a direct sales force. But resellers objected loudly to such efforts, which they see as attempts to undermine their own sales efforts. From this conflict we've gained the hybrid corporate selling force — the gang of vendor reps that evangelizes a product, then points buyers toward a local reseller to actually fulfill the sale. Thus the reseller can establish a relationship with the customer, offering service, training and add-on packages.

But PC publishers are beginning to see that this team approach to selling may not work when the product is something foreign to the retailer — like a translator package that lets a PC product talk to a mainframe. With this kind of product; new technical issues and buzzwords arise, such as communications protocols on the host and terminal emulators.

Using a complex network of direct sales forces and systems integrators, minicomputer publishers have figured out how to get that software buyer in MIS. That may not be enough to succeed in the PC market, though. Although PC buying is more centralized than it once was, it is not universally handled through a single office.

Despite the move to more systems-oriented packages, none of the publishers feel they can give up the retail channel for distributing a wide range of potential PC software buyers. And this is where both the minicomputer and microcomputer sellers will find themselves trying to balance on a sharp razor: developing and maintaining good relationships with the retail channel for some products while sending a direct corporate sales force to visit MIS departments to promote and sell systems-oriented products.

Another hybrid category of reseller is bound to emerge as publishers try to cross into new markets. At this month's Adapsco meeting in Dallas, publishers from both sides of the computing world tried to figure out how they could sell emerging products without cannibalizing their existing sales channels. How can a publisher sell certain levels of its products through its direct sales force while leaving low-end, PC-bound products for the

channel? And how can publishers establish a system to reliably handle customers' questions when conflicts or compatibility problems arise?

The next-generation software will require a next-generation reseller — one who can assist a corporate buyer make a strategic decision about which database system to buy. As such, these sales can take a long time to close as the buyer evaluates all his options. At the same

time, these resellers will carry a variety of packages from competing vendors.

This is likely where the battle between Database and Oracle will take place, where groupware will be sold effectively, and where the myriad vendors who've announced Unix products will try to get some attention. As these publishers move into each others' markets, a middle ground of distribution will emerge — and will be fought over.

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IMAGEN Corporation 408-966-9400
2650 San Tomas Expressway Santa Clara, CA 95051





TECH STREET ■ BY JOHN GANTZ

Listening for the Chain Saw on the Dark Side of Tech Street

This being the evening that Main Street battens down the hatches against hobgoblins, ghosts, warlocks, gargoyle, and other things that go bump in the night, maybe it's time we took a walk down the dark side of our own Tech Street.

Let's screw up our courage, put our hand in the hole in the hollow tree, and see if we pull out a secret message, or a bloody stump. Let's sneak past a few crypts, see if those are puncture wounds or cuts on our neck, and discern once and for all whether that strange noise we hear is the neighbor's motorcycle or Leatherface's chain saw idling in the basement. But let's whittle while we do it, OK?

And let's start with ghosts. If there's one that haunts the industry more than any other, it's the ghost of Ovation. Plenty of companies in our business have heard the minister recite the ashes-to-ashes theme, and plenty will hear it in years to come. You might even say the first was a company called Viatron, which introduced and manufactured a device called The Everything Terminal that in 1968 bore an uncanny resemblance to a PC of today. But there are other names known to us, from Columbia Data Systems and Gavilan to Victor Technologies and Vector Graphic.

But Ovation's ghost is more restless than most. The company, which died well after receiving rave product reviews for its

integrated spreadsheet, word processor, database, and graphics package and before shipping any real product, left life just, well, so unfinished. The term "vaporware" became more than a joke as a result of Ovation; the investment community learned cruelly that the easy money era of the industry was over; the young founders discovered that the industry is a lot more forgiving of experienced veterans who fail than newcomers; and PC analysts heard the door slam shut on a five-year hood that ended in 1984. Ovation was one of the last companies glimpsed on the far side of that door—an unerring tribute to all that might have been and wasn't. Brrr.

For hobgoblins, I'd have to nominate the venture capital community as the most bedeviling — but it's a matter of structure, not the will or wishes of those who practice the art. Thanks to a remake of pension fund rules in the late 1970s, the amount of money in venture funds increased close to tenfold in a matter of a few years. With all that money chasing a relatively fixed number of good deals, a lot of bad deals got made.

Perhaps the worst example is the disk drive business. In the early 1980s scores of companies coagulated out of the primordial goo to strike it rich in making storage devices for all those personal computers the market forecasters said would be shipped. The state of the art got advanced, all right, but so did the state of competition. Prices fell, margins evaporated,

and manufacturing capacity grew faster than demand. It's still going on. According to Dataquest, there's capacity now to build 17 million drives — against a 1988 demand for 14 million.

Who's your candidate for Warlock of the Year? Mine is Ken Olsen, chief executive of Digital Equipment Corp. Whether you consider his magic black or white, he's managed to ink what sometimes look like contradictory deals with almost every major player in the business.

unnatural powers working for him.

In the gargoyle, or stationary menace, category, should we talk of IBM or of Japan Inc.? Or both? Both are fixtures along Tech Street and both have the capability to topple onto passersby below, IBM, as it muddles along as a player and fragments the market as much as possible — the better to get market share in the choice fragments — does little to calm nerves on Tech Street. Will OS/2 make it? And will the industry be advanced or hindered if it does or doesn't? Why is the future so murky, its portals so shrouded? And those Japanese, holding the keys to low-priced manufacturing and to the semiconductor memory business — are they smiling benignly on their lofty cornices? Or is that a different, more inscrutable look? And what about those two-stroke engine noise?

Tough to tell from here, under the covers. It might be Steven Jobs, coming to do a number on the business, but I can't tell if he's got a chain saw or a 50cc Honda moped. Better wait till morning to investigate.

Say, what's that noise on the window pane? We're not expecting any clandestine visitors are we?

What the . . . ?

John Gantz is editor of the Tech Street Journal, a newsletter on the high-tech stock market and business performance. The views expressed are his own.

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PERSPECTIVES



ORCHESTRATING WORK TEAMS

By PAUL SAFFO

An odd new word — *groupware* — is on the loose in the computer industry. It's splashed across editorial pages, overheard at conferences, promoted by marketers, and debated by pundits. But what is groupware, anyway? A new computing concept? A novel product category? Or simply the latest in Silicon Valley hyperbole? The short answer is a bit of all three, and something more besides.

Groupware refers to a vision of computer aids designed to support business teams. It's more than just software: It includes hardware, organizational theory, and even professional services. Groupware has been most closely associated with so-called "high-performance teams" — small, elite workgroups with unique missions and tight deadlines — but it's equally appropriate for large groups of workers performing routine tasks.

This vision is expansive to say the least. Virtually every office task from phone tag to writing memos has a group dimension and is a candidate for groupware. It's also a vision that has been around for some time.

SUPPORTING BUSINESS TEAMS. Attempts to use computers for group applications date back to the early 1960s, when a team assembled by Doug Engelbart at Stanford

Business demands and technological breakthroughs make the time right for groupware, but the effect these products will have on the way people work is still open to question.

Research Institute began work on a system to provide communications and support for high-performance teams. Called Augment, the system allowed teams to perform many groupware functions, such as conferencing, group writing, calendaring, and project coordination.

Not only has the philosophy behind groupware been around for a while, even the term groupware is not new. It first appeared around 1980, probably coined by researchers Trudy and Peter Johnson-Lenz. Over the years its usage gradually mutated in the academic literature alongside a baker's dozen of similar terms: workgroup computing, collaborative computing, interpersonal computing, group decision support systems, and group augmentation, to name a few. Groupware has never been a popular

term with academics (to this day, most researchers prefer the more cerebral-sounding phrase "computer-supported cooperative work"), but it has the advantage of being short and catchy — just the right thing for the rest of us.

If groupware has been around for so long, why the sudden interest outside of the research lab? For starters, the technologies that make basic groupware products possible are just beginning to fall into place. Many groupware products will require a local area network for communications, as well as the power and flexibility of new workstations for acceptable performance.

At the same time, the business need for new approaches to team support is becoming acute. Economist Peter Drucker has noted a fundamental change in leading corporations today: Traditional

command-and-control structures are eroding as managers discover that corporate success is increasingly dependent upon the activities of informal, task-oriented business teams. Drucker believes corporations will eventually resemble orchestras — a set of autonomous professional teams coordinated by a "conductor." Management by hierarchy is giving way to management by "ad-hocracy" as executives struggle to find ways to nurture and coordinate these new business teams within overall corporate goals. Good groupware products could go a long way toward aiding this process. In fact, there are already a few early success stories in the construction and aerospace industries where team-oriented management structures have long been the norm.

CLASSIFYING PRODUCTS. Groupware products today can be divided into three categories: "true" groupware, products with groupware dimensions, and groupware platforms and environments. True groupware is like a telephone — it must be used by at least two people to be used at all. Typically, true groupware is sold only in multiple copies.

True groupware products have grabbed most of the headlines to date. Because personal computing is just about the last solitary office activity, the introduction of group computer tools struck users and the press alike as an exotic

innovation. Often these products simply simulate a process already conducted on paper. For example, For Comment, a group writing tool from Broderbund, allows a team to electronically review and annotate a document on-line, automatically organizing the annotations for the convenience of the original author.

The second category — products with groupware dimensions — encompasses products that can be used by one person but also have value to a group. Decision Pad from Apian Software is an example. Designed as a single-user decision support tool, Decision Pad is finding growing use by small groups of decision makers huddled around a common screen or projection display. Some of the most intriguing products in this category are games, such as Macromind's MazeWars or Sphere's Falcon. Both can be played by a single user, but they take on a whole new dimension when a group is involved.

At the moment, true groupware prod-

ucts outnumber and overshadow products in the second category, but this will change in the next few years. True groupware likely will become a niche market, and products with groupware dimensions will become the big sellers. The reason is simple human nature: True group products require a group purchase decision, which involves both time and hassle. (Of course, the software can be purchased by a fist of senior management, but that is hardly a factor for team-building success.) It takes an average of six months for companies to decide on a groupware purchase, and an unknown number never get around to buying the product. This group-purchase hurdle has been a real problem for many groupware start-ups. Despite the attention given to their products, actual sales volumes are modest, and profitability is often elusive for these firms.

By contrast, purchasing products with groupware dimensions remains an indi-

vidual decision. Imagine a conventional word processor that includes the group writing features of For Comment — a single user could purchase it for personal use. Then, as others in the organization purchase copies, a work team could begin to explore the group functions. This process nicely matches both current purchase patterns and the ad hoc nature of most business teams. And from a developer's perspective, the groupware features cease to be a block and may even create an incentive for follow-on sales.

Another factor in favor of the second category is the tendency of groupware products to build on tasks already performed by individual users — such as writing, scheduling, and E-Mail. Once the novelty of groupware wears off, it may come to be viewed more as an additional dimension on existing applications than as an application category in its own right.

HEAVY DEMANDS. The third category,

groupware platforms and environments, is at once the most and least developed of the three. It is most developed because the recent availability of basic platforms such as LANs and powerful PCs made the sale of early groupware products possible. But platforms and environments are also the least developed because all but the simplest groupware products will require more computing horsepower and deeper applications integration than is available today. For example, Coordination Technology Inc., which is doing some of the most interesting work on coordination-based groupware, abandoned plans to develop its product for DOS, electing to go directly to an OS/2 environment.

Even new systems such as 386-based computers and the Mac II may fall just short of meeting groupware needs. Personal computers were a hit because even a small amount of power on one's desk meant better performance than time-sharing on some remote system. Loading

■ TWO TAKES ON WORKGROUP COMPUTING

Letting Workers Coordinate Their Group Efforts

BY DAVID J. BUERGER

Groupware is more than just software used by people in a workgroup. It's an attitude, central to the success of companies in the information age, that will change the way we use computers to do business.

The type that pervades the computer industry makes it easy to dismiss groupware as a short-term marketing ploy. Indeed, few of the existing "official" groupware packages do little to stir one's imagination or foster much enthusiasm. There's a danger, though, in letting the state of current products shape our opinion of groupware as a whole.

Mainframe users have enjoyed electronic mail and scheduling software for years, yet the introduction of such products for personal computers has triggered a good deal of controversy. In the midst of all the excitement, one wonders what's so objectionable about software that can help groups of people work more effectively and cooperatively.

One catalyst that is focusing attention on groupware is the local area network. The typical LAN is relatively small — perhaps a half-dozen PCs or so — and used primarily by members of a common workgroup. After years of using LANs, people are looking for new ways to use networks to further business goals. Workgroup software is an obvious candidate.

BRINGING PEOPLE TOGETHER. Workgroups are the modern production vehicle for bringing innovative ideas to fruition. Unlike traditional hierarchies, workgroups often bring together people with diverse talents from different departments with different bosses. Rapid change is the norm today, and workgroups are vital to keeping up with this pace since horizontal problem solving leads to quicker, more innovative decisions.

But a workgroup's diversity in both talent and reporting paths also poses unique challenges. Its most vital need is constant, clear communication about who is doing what, when, where, why, and how. Groupware squarely meets this requirement by helping to organize and



MICHAEL C. LAIR

control cooperative tasks. Some of the most obvious uses are managing telephone messages, scheduling meetings and conference rooms, planning projects, juggling resources, tracking who's done what, delegating tasks, retrieving vendor and contact lists, and managing local and wide area E-Mail. The truly revolutionary uses of groupware, though, will only become clear as the product category matures and users have a chance to experiment with the software.

MAKING A COMMITMENT. Although a president or high-level manager can mandate the use of group-oriented software, unless all group members agree to fully utilize the program, its success is limited. This commitment may reach beyond what is ordinarily required by a workgroup, and such major corporate changes take time.

The level of commitment required for groupware presumes that a group truly needs the software. If communication needs are best met with groupware, the effort is worthwhile. Otherwise, it's a waste of time and money.

Groupware critics often argue that such packages only serve to impose external controls and restrictions on individual freedoms and activities. These fears are unfounded, however. Groupware isn't designed as a tool for top management to keep a watchful eye over the daily activities of employees. It's a productivity tool for small work teams, whose members typically have no authority over one another.

Groupware is a concept that requires commitment, but it also offers great communication benefits to small, cohesive workgroups. It offers the potential for substantial improvement to the way people work by giving small groups the tools to control their work, and not let the work control them. □

David J. Buerger is executive editor of connectivity and testing at InfoWorld.

External Control Key to Current Crop of Products

BY DON CRABB

Introduce it with fanfare. Hype it. Oversell it. Then let the columnists fight over it. Such is the capsule history of groupware computing. We're talking the hot topic now in computing. So much heat, but sadly, so little light.

Workgroup computing takes the decades-old group computing concept, refines it, and applies it to PCs and LANs. Not, in itself, a bad idea. Who doesn't want to share information transparently and work better with one's colleagues?

But the current crop of programs falling under the workgroup rubric leaves much to be desired. They take the simple idea of groupware computing — the sharing of information, ideas, partially completed work, and group schedules and calendars — and emphasize the aspects of control that such sharing schemes spawn. As it stands, workgroup computing equals workgroup control. But the problems go much deeper than the current software. The problems go to the heart of what workgroup computing is supposed to be about.

JOINED AT THE HIP. To date, despite plenty of academic and commercial research into workgroup computing (the MIT Center for Information Systems Research has been particularly active), nobody has consistently made the case that electronically linked groups foster better individual performance, improve group dynamics, or hasten project completion.

The problem can often be reduced to the people involved. Some individuals may work well when they are electronically joined at the hip with other members of their workgroup. Others function poorly in this situation, because they don't find electronic interactions satisfying or complete enough, or providing sufficient nuance. When you organize projects primarily over computer networks you depersonalize the process. No amount of jazzy E-Mail graphics, shared calendars, or explicit commitment demands can fill this void. Human beings interact on so many levels that we can't begin to



DON CRABB

systematize these interactions.

Besides these fundamental concerns, the biggest problem with the workgroup concept is that it's been oversold. The really creative workgroup software — the stuff that will blow us away with its new orientations — hasn't hit the market yet.

Instead, the promise of workgroup computing has been substituted for available software. While we wait for the first generation of true groupware, we're stuck with older products that only emphasize the control of simple communication among group participants. By lowering our expectations, these current products may even damage the future market for more advanced programs.

A look at one of the current workgroup packages, The Coordinator by Action Technologies, illustrates this problem. The Coordinator works like an E-Mail system for workgroups, but goes way beyond simple messaging. It's actually a fairly elaborate, sophisticated, and rigid E-Mail conferencing system that keeps the idea of project control at the forefront. The whole idea behind it can be summed up in two words: explicit commitments.

GESTAPO-LIKE. And the problem is not restricted to this piece of software. It's shared by other packages. Workgroup software may be the next great breakthrough in microcomputing. Or it may be a dud. Right now, we just don't know, because the first real workgroup software won't appear until at least 1989. Let's hope that it offers some genuinely new and useful paradigms for sharing micros. It would be a shame if the gestapo-like programs we've seen so far are the best software ever spawned by the concept of workgroup computing. □

Don Crabb is the director of laboratories and a senior lecturer for the department of computer science at the University of Chicago. He's also a contributing editor to InfoWorld.



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Step 286/16	3.93 MIPS
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TO THE EDITOR

A Very Long Eight Seconds

I read Jeff Angus' column "Speed Doesn't Kill, But Then Neither Does the Lack of it" (October 17) with some amusement. While Mr. Angus is probably right in his extrinsic calculations of pennies saved in employee time on a fast word processor vs. dollars spent for that word processor, he overlooks the rather obvious and doesn't seem to address the intrinsic considerations that waiting eight or however many seconds in midstream while working on a computer a) always seems to be a very long eight seconds, and b) is an annoying interruption. To be writing in a word processor and having to thump fingers on the side of the keyboard while waiting every time I want the program to do something is not what I care to encounter while I'm working.

Mr. Angus selects a few word processing benchmarks (jumping to the end of a document, deleting characters, search/replace) as criteria for his calculations. However, my experience has been that if a few features are inordinately slow, in all likelihood most, if not all, of the rest of the program is going to be inordinately slow as well. So while he calculates pennies saved (or lost), how about how long it may take to perform intermittent saves, call up a synonym, spell check, reformat, sort or renumber a list, repaginate before printing, and so on? Add everything into the cost of using the slower software, not just a few benchmarks. Then he should consider the human being who is sitting there at his computer waiting, however few seconds (but waiting), through all this, and he might find more than pennies saved by spending more for a faster word processor. You might find user satisfaction rather than grumbling through a program, an intrinsic consideration that can be measured only in terms of the quality of the output, not quantity.

My experience has been that people work better on the faster software.

Bob Brody
Los Angeles

Jeff Angus replies: Mr. Brody has some good points about the frustration of waiting, and his framing of those arguments is indicative of his point of view. He says, "waiting eight or however many seconds in midstream while working on a computer a) always seems to be a very long eight seconds, and b) is an annoying interruption." Well, he is certainly right.

But the sad fact is that Mr. Brody is not really more annoyed with his eight-second wait than he is with the five-second wait the "faster" competition provides. Once it goes beyond about three seconds for the experienced computer user, frustration is reached.

The truth is, most secretarial word processing users, the user category on which workplace productivity most hinges, aren't frustrated with word processing compared to typing. As our man Einstein stated, time is relative, and the wait that makes Brodys and Angus go Type A personality is imperceptible to the vast majority of office workers who live with time as defined by work accomplished, not by the speed of their computer tools.

For businesses to be productive, we have to keep feelings about perceived time subsumed to what work gets done and when — content over form.

Who-What-When vs. Agendas

I was reading William Zachmann's column with the headline "PIM Software Can't Compare With Basic Products in Broad User Acceptance" (August 29). His points are well-taken. Who in his right mind wants software so complex that he needs a "Ph.D. in computer science" just to use it? However, there are some striking errors in his column.

Zachmann jumps "Chronos" Who-When with Lotus' Agenda as examples of "sophisticated PIM software" despite the fact that they're on opposite ends of the spectrum. Who-What-When is a simply structured management tool,

whereas Agenda is an unstructured database.

PIMs are typically described as imitating the way that our minds work. But is this necessarily a good thing? Whoever said that the more complex and creative your mind is, the more incredibly complex your software needs to be? And guess where the structure went when it came to using unstructured databases? It's right there in your already overburdened brain. And therein lies the point of it all:

Busy people don't have time to learn how to use an unstructured database. However, reviewers ranging from Michael Miller to John Dvorak to TV's "The Computer Show" all describe Who-What-When as being "simple," "elegant," "easy to learn," and having a "10-minute learning curve." How can Zachmann critically compare Who-What-When to Agenda — a product you never stop learning how to use?

Who-What-When offers a simply structured approach because structure equals organization. We believe that the more complex your mind is, the more you need a simple tool to work with. Simple is powerful.

Stanley Arcieri
Executive Vice President
Chronos Software Inc.
San Francisco

RESOURCES

November 1-3, Anaheim, CA: The Macintosh Business Conference & Exposition will give buyers the chance to evaluate Apple's Macintosh business' solutions. Location: Disneyland Hotel and Convention Center. Contact: Cambridge Marketing Inc., (617) 860-7100; Germania DRK Inc., (617) 494-5883.

November 2-4, Monterey, CA: CASE Research Corp.'s Annual CASE User Conference will focus on actual user experiences. It will feature speakers on the theme "Managing the Transition to CASE." Location: Doubletree Hotel at Fisherman's Wharf. Fee: \$795. Contact: Paul Berkshire, CASE Research Corp., 155 108th Ave. N.E., Suite 210, Bellevue, WA 98004; (206) 453-9900.

November 8-10, Philadelphia: The Association for the Development of Computer-Based Instructional Systems will host its 30th annual international conference on the use of computers in training and education. Over 400 presenters representing government, private industry, and elementary, secondary, and post-secondary education will take part. Full-day pre-conference workshop on November 7. Contact: ADCIS, 409 Miller Hall, West-

ern Washington University, Bellingham, WA 98225; (206) 676-2860.

November 9-11, Boston: AT&T and Sun Microsystems will hold Unix System V, Release 4.0 Software Developer Conferences in several cities this fall. The three-day conferences are designed to provide technical information on the key features of Release 4.0. Conferences will also be held in Chicago, San Francisco, and Washington. For registration or more information call (800) 247-1212.

November 9, Chicago: The Chicago Association for Microcomputer Professionals (CAMP) is holding its seventh Conference/Vendor Fair. The keynote speaker for the fair will be Microsoft chairman Bill Gates. Contact: CAMP, P.O. Box 380, Deerfield, IL 60015-0380; (312) 831-0286.

November 10-11, Boston: Gen2 Ventures is conducting a seminar on SAA, IBM's strategy for bringing cross-system consistency and application portability across all its systems lines. Contact: Gen2 Ventures, (408) 446-2277. Cost: \$795 per person with multiple attendee discounts available.

November 16-18, Boston: "Standards and the Desktop" is a conference designed to explore the range and power of the international Standard Generalized Markup Language for text and graphics. Location: Hotel Meridian. Fee: GCA member, \$495; NADTP member, \$590; nonmembers, \$685. Contact: Graphic Communications Association, 1730 N. Lynn St., Suite 604, Arlington, VA 22209-2083; (703) 841-8160.

January 17-19, New York City: An annual Computer Graphics Show will exhibit hardware, software, and services. Location: Jacob K. Javits Convention Center. Contact: David J. Small, Exhibition Marketing & Management, 8300 Greensboro Drive, Suite 1110, McLean, VA 22102; (703) 893-4545.

InfoWorld welcomes notices of national conferences, trade shows, and meeting schedules of professional data processing, MIS, information center, and micro-computer management associations or support groups. Send notices to Resources, InfoWorld, 1060 Marsh Road, Suite C-200, Menlo Park, CA 94025. No local training or education seminars, please.



RIDING THE FOURTH WAVE ■ BY JEFF ANGUS

Next Developers Will Be Working in Galapagos-like Isolation

Last week I intentionally left unanswered the question of who would end up developing the software that would make Next Inc. workstations competitors in the business arena.

Since I already explained the logic behind why it won't be the existing Unix community, the dominant DOS developers, or even the small innovative shops that produce Mac or DOS applications, who does that leave?

The Galapagos lizards.

The business programs will end up being developed by the college kids who will cut their Unix teeth on the Next machine. Its bundled language will be the ones they're imprinted with, the ones they think in, and the ones they will most naturally want to develop programs in.

The machine has some consumer hooks in it, like the squeeze in Charmin or the lemon scent in Sunlight. Next has megapixel graphics, CD sound, and a Museum of Modern Art box design — all engineered to appeal to the consumer-oriented subgeneration: late adolescents.

Both computer science grad students and students in other areas who see their faculty playing with these systems are going to be sucked into the Next ethos like 9-year-olds into Nintendos. They're going to want to master them and make them sing.

This urge, however, is going to happen outside the mainstream of business computing.

Next developers will be isolated, like Galapagos lizards, from the Unix society. And the product distribution issue assures complete separation. Because the least expensive removable media for Next is the \$50 erasable optical disc, vendors aren't going to sell \$99 desktop utilities for the system.

Next vendors are going to have to revamp distribution, making it electronic for paid downloading of applications. The most economic form of distribution will be a phone-in service where buyers provide a credit card and get a password to download from a bulletin board. More predominant than that, distribution will be internal — within Next-centered organizations.

Programs will be distributed broadly within the developing organization, either through networks or passed-around media. Each application will be refined not as a commercial effort, but as a research project. And these Galapagos products won't be built to thrive in the larger world of business.

The Next machine, restricted by the company's declared sales policy and the lack of apparent business revenue to be won, will surely be a "Galapagos island" — distant from the continent of business computing. That continent is populated with all the organisms currently struggling for survival, but this Next/Galapagos island has none of the continental predators who stamp out emerging life forms to protect their turf and shape their environment.

The college kids' computer talents will evolve, like Galapagos lizards, into uncommon organisms with their own un-

common sets of behavior and standards. When you see a product for the Next machine, it will shock and disorient you, because the society of kids that learn on it won't know anything about the old Unix culture, and may not even have many cognates from the DOS culture. They will be children of Next, and it will be exciting to see their products.

Will these academic computer whizzes have brilliant stuff for real-world business

computing buyers?

I think it will be worth looking into. I think they will try to create solutions that no one else is working on. Still, it's a long way off. In case it hasn't been made clear, Next won't be part of your purchasing questions until about the second quarter of 1991 — all the protests from the traditional Unix developers to the contrary.

Unix on the Next machine will have

become merely an agar dish for breeding a mutant operating system, and the old Unix culture, as well as the performance it promised, will recede into the horizon.

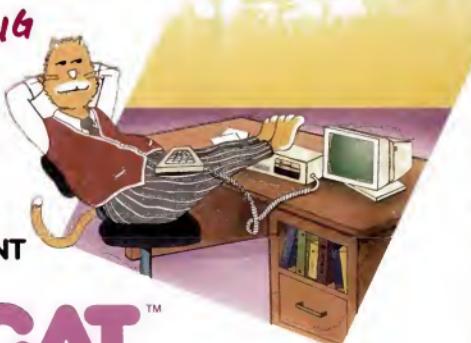
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A USER'S VIEW ■ BY JERRY POURNELLE

Is Next's Lack of a Floppy Based on Religion or Economics?

In Aesop's fable, the mountain went into labor, and after several weeks of groaning produced a mouse.

After all the hoopla about Steve Jobs' Next computer one might have expected much the same thing, but in fact the Net is an impressive box.

Everyone has described what's in it, so I don't have to go into details. It's a big Unix box with lots of trimmings, clearly designed to compete with the Sun.

There's no floppy and no hard disk; instead there's a read/write optical drive with removable media. It's very much designed for networking and electronic communications in general.

Steve Jobs has said that he wants this next to "raise the least common denominator," meaning that he wants to force a quantum jump in what kind of machine the user expects and will put up with. This is a sentiment that I thoroughly agree with.

The question is whether users will pay the price for that increased expectation.

Apple's Macintosh has done something of the sort, but it had to do it the long way, because the Mac costs so much; it would have been more the computer for the rest of us if all the rest of us could afford one. Anyway, I wish Jobs well in that part of his endeavor.

A MATTER OF TRUST. Some concerns come to mind. First, I'm not sure I'd trust all my work to a read/write optical drive with removable media and no backup system. True, I have considerable confidence in WORM drives. I have both Maximum Storage and ISI WORMs and they're wonderful; but even now I put critical work onto floppies in addition to WORM.

Then, too, WORM drives have been around long enough that I have some data to base my confidence on. Not so with read/write optics.

I may be foolish, but I recall when removable hard disk cartridges first came out. It looked like a wonderful idea, but it turned out there was a problem with spindle wear, and a lot of people lost data when the removable hard disks became unreadable after a year or so.

I also wonder about the lack of a floppy disk drive. My sources tell me it wouldn't cost more than \$40 for Next to have added a high-density 3½-inch drive; that would bring the price to \$100 and \$200 more on the list price, at least according to the conventional wisdom.

However, I question the conventional pricing strategy. While it's true that if you're going to make a profit you have to sell for at least twice your manufacturing costs (and more if you're trying to impress investment managers), it is not true that you have to apply that formula to every part in the box. As an example, assume you have a machine that you're selling for \$6,000. If you're selling all you can make, you don't have a problem; but if the lack of a \$40 part is slowing sales, you can either eat the \$40 cost, add \$40 to the sale price and break even, or add \$100 to \$200 to the sale price.

This will increase your profit on units sold, but also up the price of your system and possibly hurt sales.

Every one of those decisions can be justified, at least to anyone other than a Harvard MBA, and they haven't man-

aged to figure out how to look past next week anyway.

DIVIDE AND CONQUER. I could be wrong, but I suspect the lack of a floppy on the Next is more a religious decision than an economic one.

Jobs, after all, brought us the 128K one-floppy no-hard-disk never-to-be-modified-or-upgraded Macintosh. When asked by Next developers about floppies, Jobs headed straight for obscurantism. He mumbled something about bold new philosophies and the like.

The reason this concerns me is that it could be yet one more attempt to divide the computer revolution. It has always been traditional for mainframe and big minicomputer makers to fence off their customers and isolate them from each other; IBM software won't run on DEC machines, which keeps the software sales volume low and in theory justifies astronomical software prices. That strategy hasn't worked well in the micro environment.

Apple has managed to keep its users away from the IBM-compatible world, but then Apple has been around long enough that there was, for a while, some question of whether Apple wasn't the

ware developers.

IF IT WORKS, KEEP IT. Then, too, one reason people aren't so anxious to throw away their old equipment is memory costs. If you've invested in memory boards at today's memory chip prices, you'd as soon get some use out of them; meaning you're not quite so anxious to go to a new bus and buy new add-on cards.

It's ironic, of course: Since IBM makes its own memory chips, the U.S. Department of (No) Commerce memory-chip cartel did help IBM in its war against clone makers by running the systems prices up. Now that's hurting micro channel. It just goes to show that interfering with free markets often has unexpected effects. I wish they'd stop doing that.

From my viewpoint it's just as well as we get to keep the old PC AT bus for a while longer, since I'm just getting things set up the way I want them. What I have is an XT clone from Sterling Solution. It's dedicated to communications: the Complete PC Answering Machine and the new Intel Connection Coprocessor. Both of these have on-board processors; the Intel board has an 80186 that runs much faster than the XT clone's

software and the Microsoft DOS extensions to access CD ROM only have to be in the generic clone; that way I keep my big Cheetah 386 with clear memory except for the relatively small resident code that Lantastic wants. Lantastic can get away with this because its boards also have a coprocessor, in this case a Z-80. Thus it doesn't steal CPU cycles, and most of its program is in its own board ROM.

The really neat part is that the Amdek Laserdeck can be easily-chained so that I can have two different CD ROM discs online at all times. For the moment those are the Microsoft Bookshelf and the McGraw-Hill Encyclopedia of Science and Technology. I can access either one of them from here.

Alas, I haven't quite got this setup working with Desqvew yet. I don't have any trouble accessing the networked WORM in a Desqvew window, but there do seem to be some difficulties with the CD ROM on the network. I expect that I'll get it all straightened out one of these days. Meanwhile, I'm just as glad not to be changing bus architecture just as I'm getting things set up right.

A LIST OF UTILITIES. I'm finishing up my new book, *The Chaos Manor Guide to Easy DOS Computing* (Brady, Simon and Schuster, Real Soon Now) and I've been writing the chapter on useful — even vital — utilities.

I'm sure I'm not through with the list, and already I'm amazed at how many there are. They come in two categories: those I use every day or so, and those I seldom use but find vital when needed.

Among the products in the first category are: Norton Utilities, Golden Bow VOPT and their other stuff, QDOS and Norton Commander (I don't really need both, but I hate not to have at least one of them), and Borland International's Sidekick (I expect I'll get around to using Sidekick Plus one of these days, but I find old Sidekick itself good enough, and I'm used to it).

There are also Grandview and Desqvew, which aren't precisely utilities, but used together they act like one: With Grandview in a Desqvew window it's so easy to make notes that I no longer lose ideas while I'm working on something else.

In the "you'd better have these" category are Mac Utilities, Steve Gibson's Spin Rite, which is plain wonderful (but as far as I can tell, you don't have a FASDI hard disk). Gofer (which you would want to put in the "gotcha have every day" category, depending on how often you find yourself wishing you knew where you'd put certain files); CPYAT2PC, which lets high-density AT drives write disks readable by PCs with 3½-inch floppies; and Xenocopy, which takes files from foreign 5¼-inch disk formats like CP/M and Wang and Micropolis and reads them into your PC.

A few months ago I'd have put Fastback in this list, but now that I have a WORM drive, I don't use it any more. If you don't have a WORM, you probably need Fastback.

I'm still working on the list, and I'm sure there will be a bunch more; meanwhile, I swear by all these.

Jerry Pournelle is a noted science fiction writer and computer columnist. The views expressed are his own.

"The Next machine has a lot going for it, but if its marketing strategy is indeed driven by the desire to fence off its users from the rest of the computer world, it will turn out to have been a mouse after all."

mainstream and the CP/M S-100 systems the offshoot; it took IBM's entry into the PC world to settle that issue.

The Next machine has a lot going for it, but if its marketing strategy is indeed driven by the desire to fence off its users from the rest of the computer world, it will turn out to have been a mouse after all.

IBM'S MICRO CHANNEL STRATEGY. On that subject: When IBM first came out with the Micro Channel Architecture bus I confess I liked it a lot. I thought the industry was ready for a new standard bus that wouldn't have some of the problems the standard AT bus encounters at high clock speeds. It looked as if IBM had stepped out front as the industry leader again.

It didn't work out that way, largely because IBM didn't want it to. Big Blue actively discouraged industry adoption with its licensing policies; they even asked for retroactive fees from anyone who had used the PC and AT bus structure. Big Blue's leaders apparently decided that IBM had enough marketing clout to get people to buy Micro Channel under the IBM label.

It's understandable, of course. IBM has been gnashing its teeth over the clone makers' market share, and hoped to take care of that with Micro Channel and the new licensing policies. Alas, it doesn't seem to have worked. There has been no rush of third-party Micro Channel hard-

8086.

This machine is networked with Artisoft's Lantastic to several other machines. The result is that I can use the net to get my electronic mail.

The Intel board is more a curiosity than a useful just at the moment: It's good for talking to other Intel Coprocessors at 9,600 bps, and so far I don't know anyone else who has it. It would be great for a company that has a number of offices in different locations.

Also, it will send and receive fax messages and Intel advertises but didn't send me a 2,400-bps modem that can piggyback on the Coprocessor. What's neat about the board is that it can be programmed to call up any number in its phone book at whatever time you specify; it can send messages; and it can grab any that it can find.

Since it's running on its own 80186, it doesn't tie up the XT, so it's free to serve the network and the Complete PC Answering machine (which will soon be its own phone line). I'm only just getting started with this, but I don't anticipate any problems.

The next step is to set up a generic clone AT with a Maximum Storage Systems WORM drive and an Amdek Laserdeck CD ROM reader, and connect that machine up in the Lantastic net. I know that will work because I've done it before.

The advantage here is that the memory-resident part of the WORM drive

PRODUCT COMPARISON

PORTABLE COMPUTERS EXPAND THEIR NICHE

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These "lunch box" luggables perform a key role, offering expandability for RAM and add-ins, larger hard drives, and improved displays.

Fondly referred to as "luggables" and "lunch box" computers, portable systems are carving a strong market niche for themselves. With their increased power and capacity, along with competitive pricing, portables meet market needs that laptops and larger systems can't.

We tested four 386 and four 286 portables. Compaq and Micro Express have one machine in each category.

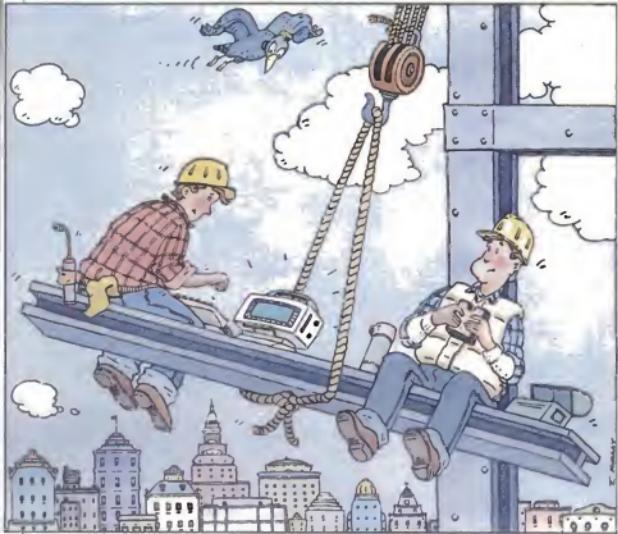
What distinguishes the lunch box computers from their smaller cousins is more than just the case. Portables have far greater flexibility for expansion. Most have at least one free expansion slot on the motherboard and often offer an additional expansion chassis with approximately four slots. Portables can accommodate larger hard drives, with some vendors already offering a range of drives from 20 to 170 megabytes. Additional flexibility comes in RAM. Because of their expansion slots, portables are not limited to the amount of RAM available on a motherboard. All of the 386 machines and many of the 286s come standard with a memory board in one slot. All four of the 386 machines can be loaded with up to 10 megabytes of RAM.

Video technology advances are destroying the old display stereotypes for these smaller machines. With the entrance of gas plasma and electroluminescent screens, these systems are now more viable for extended use or product demonstrations. Of course, they all can be connected to external monitors, and some now emulate EGA, allowing clearer graphics.

On top of all their technological pluses, portables are also fighting the battle of the budget. While the 386 systems topped out at a whopping \$8,999 (Scantech LCD-386), there are some jumping in at around \$4,000 (Micro Express Regal II). The 286 systems are even more affordable, with the current low-price champion at \$1,899 (Micro Telesis SX). As more clones begin to enter the market, expect prices to be driven close to or below full-size systems.

All of the units we tested fit within the legal FAA standard for carry-on luggage. The average weight is 21 pounds, and all come with padded carrying cases.

BY DAVID CHALMERS
AND SALLY J. DOUGLAS
INFOWORLD TEST CENTER



386
PORTABLES



Compaq

PORTABLE 386, MODEL 40

One of the first manufacturers to introduce a portable 386, Compaq is now several revisions deep in its portable line. The Portable 386 and the Portable III (see following review) are the current cream of the crop from Houston's computer success story. Not surprisingly, this computer was among the most expensive that we tested.

The 386 is an 80386-based computer

running at a 20-MHz clock speed. It has a plasma display that emulates a CGA display. Text is very easy to read, but color graphics have little contrast and are difficult to discern on the monitor. Software should be installed using a monochrome setting. A single serial and parallel port are present along with a nine-pin external monitor output.

The unit we tested also had an internal modem installed. (A 1,200-bps modem costs \$349; a 2,400-bps modem is \$599.) We tested the standard machine, which carries a high-density 5 1/4-inch floppy along with a 40-megabyte hard disk. The standard memory is 1 megabyte; our unit had 2 megabytes.

The Autobench testing showed a CPU performance of 4.33, which scores a very

good, although it was the slowest of the 386s we tested. The sequential disk access score was 1.35, earning a satisfactory. Random disk access showed a 2.71, and we rated it good. Both of the Compaq tests resulted successfully completed our 4-hour torture test.

Our software compatibility suite showed no problems in execution, though some of the color displays were hard to see on the monochrome screen. There is only one speed setting (20 MHz). Software compatibility rates a very good. Hardware compatibility, on the other hand, would have rated unacceptable due to the lack of expansion slots. However, Compaq does offer an optional expansion slot add-on module with two full-size 8- or 16-bit slots for \$199. The availability

of the expansion box raises hardware compatibility to poor. (This expansion module wasn't used in our testing.)

The minimum RAM with this machine is 1 megabyte, with the capability to expand to 10 megabytes. The Compaq 386 lacks RAM with the standard system. RAM capacity earns expandability a score of satisfactory.

Compaq supplies its usual thorough documentation. It is neatly tabbed into sections. There are photos to illustrate the various explanations given in the manual. A step-by-step guide for beginners is also included. The manual has an index and carries a table of contents in each of the tabbed sections. It lacks a troubleshooting chart. Compaq's fine manual rates very good.

Portable Computers: How We Tested and Scored Them

Tests in this product comparison are based on procedures we have followed consistently since 1985, with modifications to account for the faster systems that have become the norm.

We divide performance for both 286- and 386-based systems into six categories: CPU speed, hard disk sequential-access speed, hard disk random-access speed, software compatibility, hardware compatibility, and expandability.

Our benchmarks are reported as indexes, with the baseline of 1.00 being the 80286-based 6-MHz IBM PC AT Model 99 with a CMI-20 hard disk. Larger numbers in the CPU, hard disk sequential, and hard disk random tests indicate better performance. For example, a figure of 2.6 means the system tested is 2.6 times faster than the reference system.

The InfoWorld Hardware Benchmark System measures performance as it would be demonstrated by typical business applications, using the same operating system interfaces your programs do.

CPU Speed: To determine CPU performance among 286- and 386-based computer systems, we use specific systems as dividing lines. To achieve a score of excellent, a system must match or exceed the index score of 4.99, the speed achieved by the Compaq Deskpro 386/20. The 16-MHz IBM PS/2 Model 80, which clocks in at 3.20 CPU, defines the dividing line for a score of very good; the 286-based IBM PS/2 Model 60, at 1.72 CPU, defines good; and 1.37 CPU — the speed of the 8-MHz IBM PC AT Model 339 — defines satisfactory.

Hard Disk Sequential Access: Programs like those for word processing, spreadsheets, and graphics load their data files from beginning to end. This is *sequential access*, in which the drive head doesn't have to move much (even though individual sectors may not be stored as a single unit). Our tests show how quickly a drive can accept a steady stream of incoming data. This is also an important figure for those applications where the use of the hard disk is to load large programs or large data files.

We award a score of excellent to systems whose sequential access earns an Autobench index of 3.51 or better. This is the value earned by the 16-MHz IBM PS/2 Model 80 system with the 70-megabyte ESDI hard disk drive. As the leader in November 1987, product comparison of 386 systems. A very good score goes to systems with sequential access of 2.5 or better. Any system measuring 2.0 or higher is satisfactory. A poor score goes to systems with sequential performance benchmarks of 0.60 or better. Anything slower is unacceptable.

Hard Disk Random Access: Databases access hard disks differently than most other types of applications. Instead of loading or writing an entire data file, database applications reference small pieces of the file at random locations around the disk. This is *random access*, and performance in this area tests how quickly the drive head can move around the disk.

We award a score of excellent to systems whose random-access performance earns an index of 3.86 or better — the value earned by the Xtra Business Systems Model 740, the fastest random-access system in our November 2, 1987, product comparison. Any system with a random-access index above 2.80 earns a very

good score, while a 1.80 index earns a good score. Any system with a hard disk random access of 1.00 — the rating of the original CMI-20 hard disk in the 6-MHz IBM PC AT Model 99 — earns a satisfactory score. Above 0.60 earns a poor score; anything below that is unacceptable.

Software Compatibility: We can't test everything, but we have developed a software test suite that includes many of the most popular and most complicated business programs chosen to test different aspects of compatibility.

To test software compatibility for the 386s, we ran the following programs: Crosstalk XVI, Version 3.61; Lotus 1-2-3 and Word 4.0 under Desqvue, Version 2.01 with QEMM, Version 4.1; Lotus 1-2-3 and Windows Write under Windows 386; Sidekick Plus; Microsoft Word 4.0; and Paradox 2. For the 286s, we used the same programs except we dropped QEMM and used Windows 2.03 instead of 386.

We also provide an unscored throughput benchmark that simulates real-use times of the following: Lotus 1-2-3, Version 2.62; Word Perfect 5.0; Dbase III Plus, Version 1.1; and Lotus 1-2-3.

Systems that run all components of our software test suite earn a very good score for software compatibility. Systems with more than two speeds (for extra software compatibility) receive an excellent score. We drop the score one grade for each program that won't run on the system.

Hardware Compatibility: To test hardware compatibility, we installed two peripherals that tend to be sensitive to problems in system timing or to hardware address incompatibilities: the ATI half-card modem and Ethernet network cards. Systems that run these without problems earn a satisfactory score in this category. We subtract one grade if either of these boards won't run. We also installed the Intel Above Board and Hard Card in those machines that could take them. We add one grade for each of these boards that a portable can run. A machine that runs none of the boards gets a poor grade.

Expandability: This measures how readily the system can be expanded to fit your needs. To earn a good score, the machine must have a minimum of 640K, expandable to at least 2 megabytes. The number of half-height/16-bit slot, one serial and one parallel port, two half-height mounting positions, and the capability to drive an external monitor. We subtract one point for anything lacking. We add one-half point for more RAM than 640K as standard and for each extra serial or parallel port. A machine with no slots earns a poor score. The final grade is rounded down. Many of these machines offer an expansion chassis with additional slots for an extra cost. Since these can be large — impeding portability — and vary in the number and type of slots available, we chose to maintain consistency and test expandability without them.

Documentation: at a minimum, should tell you how to set up and use the system, and include accurate diagrams to illustrate text. We also look for an index or detailed table of contents, troubleshooting help, and customization information (such as installing expansion boards or math coprocessors). We award bonus points for any of the following: a quick-start guide, an informative on-line tutorial, a glossary, on-line help for the system and MS-DOS, a quick-reference card, a

written tutorial, and a technical reference provided as part of the standard documentation package.

We lower the score if the manual is poorly organized, if it lacks both a table of contents and an index, if there are factual errors in the text, or if it does not include information on installing options (such as extra RAM).

Setup for all portables is quick and simple. You just plug them in, pull down the keyboard, turn them on, and you're ready to go. Unless otherwise noted, setup rates very good.

The **ease-of-use** score is a conglomeration of the controls available on the front panel of the machine, particularly the reset switch and the quality of the video display. All machines tested have reset switches unless noted. After visual examination by the reviews editors and test center technicians, we found the best displays to be electroluminescent; they rate excellent. Gas-plasma screens are very good. Liquid-crystal displays score good or lower. Keyboard layout and style also affect this area.

Well-designed and well-built systems offer better **serviceability** than badly designed or manufactured equipment. Nonetheless, systems do break. When they do, your concern is how quickly and inexpensively they can be repaired. We divide serviceability into three areas: workmanship, support policies, and technical support.

Workmanship: We carefully examine systems to see how well they are designed and constructed. We also run systems continuously for four days or longer, which weeds out the weaklings.

A good design uses a minimum of components. Each chip, resistor, capacitor, and connector represents one more chance for something to go wrong. The system must also be mechanically rugged to take the punishment of shipment and everyday use.

In evaluating a product's workmanship, we pay particular attention to how well the printed circuit boards are soldered — a substandard job can severely shorten the trouble-free life of any computer system. We also look for excessive las-in-minute changes.

Support policies: A one-year warranty and unlimited (but not toll-free) technical support results in a satisfactory score. We award bonuses for money-back guarantees, free newsletters, corporate or extended support hours, bulletin board support (e.g., Compuserve), a toll-free number, and extended warranties. We subtract points when the vendor provides no technical support or limits the period.

Technical support: We make several calls to vendors and dealers to determine the quality of technical support. For a satisfactory score, we must easily contact courteous, knowledgeable technical support personnel twice. Products get higher scores for in-depth product knowledge or support that goes beyond the call of duty, such as suggesting work-arounds to problems or other extras. Busy signals, being put on hold for long periods, and late or no callbacks all detract from the score.

Value scores reflect the price vs. the performance and features of each machine, taking into account the competition. We divide 286s from 386s for this score.

An excellent value is one that offers top performance at a lower-than-average price; a satisfactory value features reasonable performance for a reasonable price; and an unacceptable score in value goes to systems that combine poor performance with a high price.

The Compaq 386's front panel has a brightness control, a power indicator, and disk drive access lights. There is no hardware reset button. The plasma display is a reddish-orange color with good contrast. There are no glare problems with this easy-to-read display. The keyboard is compact. The key layout was comfortable and the escape key was in the normal AT keyboard position (upper left). The function keys are along the top. This keyboard had the best feel of the units that we tested. Ease of use earns a very good.

Compaq uses modern surface-mount technology for its circuit boards. We found no obvious patches or last-minute changes. One feature of this portable was easy access for the installation of the math coprocessor. Most of the others require complete disassembly to install the coprocessor. There is an aluminum subcase to supplement the sturdy plastic case. RF shielding is evident in the design of the circuit boards. The internal layout is crowded, although this is no surprise considering the physical size of the case. Workmanship earns a very good.

Compaq supplies a one-year warranty with the 386 portable. There are extended warranties available at extra cost. Compaq uses its dealers for technical support and has no manufacturer technical support line. We rate support policies poor.

We called dealers in the local area and received satisfactory answers to our technical questions. Dealers in your area may vary. Due to the lack of vendor-supplied technical help, we can only give a poor to technical support.

The Compaq Portable 386 offers very good speed for heavy-duty use. With a price of \$7,999 for 1 megabyte of RAM and a 40-megabyte hard disk, it also carries a heavy-duty price tag. (MS-DOS and Basic are \$120 extra; there is also a Model 100, with a 100-megabyte hard disk, for \$9,999.) The plasma display is

considered a plus. Using this computer in a computation-intensive environment would bring out its best value.

We rate the Portable 386 a satisfactory value.

Dolch

386 PACK

In 1987, Dolch presented the first portable 386 to the PC marketplace, a feat often attributed to Compaq. Since then the field has grown to produce a small harvest of lunch-box-style 286 and 386 portables. Dolch has updated its first system and now has three versions of its

386: a 16-MHz, 20-MHz, and 20-MHz with 64K cache.

We took a look at the 20-MHz 386 Pack without cache. It is a quick machine whose most appealing feature is its extremely clear, electroluminescent display. While most of the units we tested only emulate CGA or monochrome, the Dolch display emulates EGA. Dolch ships its portable with a 20-megabyte SCSI hard drive, a 1.2-megabyte 5½-inch floppy drive, and 1 megabyte of RAM. CPU access for the 386 Pack came in at 5.20 in our Autobench tests and tied for fastest in this comparison. This high ranking earns the machine an excellent in CPU access. Ratings for hard disk

sequential and random access were also high, just but under the cutoff for top scores. The 3.49 sequential and 3.41 random access rates each earn a very good. However, these ratings are based on an eight-hour Autobench time.

We tried our standard 48-hour Autobench several times on two different machines, but we were unable to complete the test. We did succeed in getting our eight-hour test to run, but the shorter time raises questions about the machine's reliability. The vendor admits to experiencing problems with its original power supplies; Dolch says it has taken steps to improve them.

The 386 Pack ran the programs in our

ALL TERRAIN VEHICLE.

PRODUCT SUMMARY



Compaq Portable 386

MODEL 40

Company: Compaq Computer Corp., 20555 FM 149, Houston, TX 77070; (713) 370-0412.

List Price: \$7,999.

Features: 20-MHz 386 one-wait-state 80386 CPU; one serial, one parallel, and one video port; 60387 coprocessor support.

Storage and Memory: 40-megabyte hard disk; 1.2-megabyte 5½-inch floppy drive; 1 megabyte of RAM.

Support: One year warranty from dealers only.

Pros: Plasma display; well-built.

Cons: Price; no expansion slots in stock unit; poor support.

Summary: Works best for computation-intensive tasks; a speedy machine with very good display, good construction, and a high price tag.



ZENITH'S BATTERY-POWERED 386 PORTABLE WORKS AS WELL ON A MOUNTAINTOP AS IT DOES ON A DESKTOP.

ZENITH INNOVATES AGAIN—with the single most revolutionary portable computer ever created. The TurboPort 386. The only true battery-powered 386 portable with all the performance of a desktop...and then some.

Perhaps the peak of TurboPort 386's technology is Zenith's Page White™ display. A visible breakthrough that virtually duplicates printed-page clarity with sharp black images on a fluorescent backlit screen.

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ZENITH **data** **systems**

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386 software test suite without difficulty. With both 6- and 20-MHz operating speeds, the 386 Pack allows some additional flexibility and earns a very good for software compatibility. There are one free full-size 8-bit and one half-size 16-bit expansion slots in the 386 Pack, and we were able to install the ATI modem and the Ethernet card in the machine; both ran without any problems. We could not install the Intel Above Board since it requires a 16-bit bus, and the Plus Development Hard Card will not run in the 386 Pack since it conflicts with the SCSI drive. Dolch's system meets our minimum hardware compatibility requirements and earns a satisfactory in use.

Minimum RAM on the 386 Pack is 1 megabyte, expandable in 2-megabyte increments up to 10 megabytes for the cache machine and up to 8 megabytes for the 386-20. The system also comes with two half-height mounting positions, two serial and one parallel port, and the capability to drive an external monitor. The Dolch motherboard can also support an 80387 math coprocessor. Without the capability to run a 16-bit card, the 386 Pack's expandability is no higher than satisfactory.

Dolch provides its own manual for the 386 Pack along with OEM documentation for the I/O card. The main user guide contains thorough setup instructions, but no shortened version for experts. There are illustrations throughout the setup section, along with one main diagram labelling each system part. Dolch's documentation lacks troubleshooting information for the system. Options such as additional RAM installation are covered in the user's guide, and Dolch provides a table of contents and glossary as well. Clear text and a clean layout top off this helpful book. Documentation earns a satisfactory.

The front panel of the 386 Pack sports a brightness control, reverse display button, and reset button. Power, hard disk, and turbo lights are also included. The 386 Pack video display uses electroluminescent technology, which makes the

text and graphics even clearer than those that appear on gas plasma screens. The display has an amber tint that did not strain our eyes. And to add to this list of kudos, we found very little glare on this screen. The 386 Pack keyboard is a standard 101-key portable layout, with the function keys across the top. A constant frustration with this keyboard is its escape key, which resides on the numeric keypad. Despite the escape key position, the standard front-panel controls and keyboard, along with an outstanding display, earn the 386 Pack an excellent in use.

The internal layout of the Dolch 386 Pack is clean and uncluttered. We found no added components or wiring to the main boards on the Dolch 386. We did find one curiosity, however. The memory board's piggyback connectors were mounted on the back side of the board. Yet the back side of the card sits against the wall of the computer, leaving no room for a piggyback board. Similar cards in other portables had the mounts on the correct side of the board. This is a careless oversight, but it does not hinder the performance of the machine. Dolch's case is framed in aluminum, with a hard plastic exterior. In spite of its clean construction, workmanship rates no higher than poor due to the inability to run the 48-hour Autobench.

The 386 Pack comes with a one-year warranty on parts and labor. Currently there are no extended warranties for the

386 Pack, although a Dolch spokesman said that the company is negotiating for third-party support. Dolch handles all repairs and offers toll-free technical support from 8 a.m. to 5 p.m. Pacific time. Support policies for the 386 Pack earn a good score.

The technical support we received from Dolch was helpful and accurate. On our first call we got through immediately. On the second call we left a message and were called back within a half-hour. The technicians gave us prompt and correct answers to our questions. This courteous and trouble-free support earns a good score.

The solid features, speed, and impressive display of the Dolch 386 Pack don't come without their price. At \$6,995 (electroluminescent display, 1 megabyte of RAM, 20-megabyte hard drive), the 386 Pack is \$3,000 more than the lowest-priced 386, but it scores better than Compaq. The Dolch 386 Pack has a smaller standard hard drive than some of the other machines, although larger drives are available for additional cost. The unique plus to the 386 Pack is its display. It may be worth the extra cost for those who would use the portable machine for demonstrations or for long periods. The failure to run the 48-hour Autobench raises questions about reliability. Overall, the performance and features of the 386 Pack offset the price and reliability concerns to earn a satisfactory in value.

PRODUCT SUMMARY



Micro Express Regal II

Company: Micro Express, 2114 S. Grand Ave., Santa Ana, CA 92705; (714) 662-1973.

List Price: \$3,999.

Features: 20-MHz, zero-wait-state 80386 CPU; one serial, one parallel, and one video port; 80387 coprocessor supported.

Storage and Memory: 40-megabyte MFM hard disk; 1.2-megabyte 5 1/4-inch floppy drive; 1 megabyte of RAM.

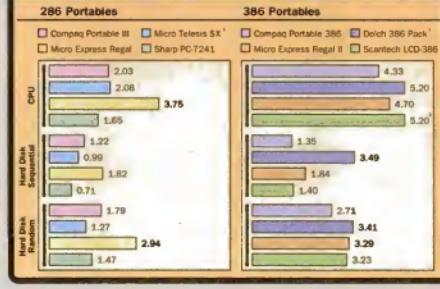
Support: One-year warranty.

Prec: Price; money-back offer; plasma display.

Caveat: Light construction.

Summary: A fast machine with a good display and a great price tag (for a 386).

InfoWorld Hardware Benchmark Results



*System unable to run 48-hour Autobench. Rating is based on 8-hour Autobench results. *Rating with cache enabled. Score without cache is 4.70.

Tests relative to the 5-MHz (Model 090) IBM PC AT at 2.00. CPU test measures main processor performance; hard disk performance is tested for sequential and random data access. Higher numbers indicate better performance.

SOURCE: INFOWORLD HARDWARE BENCHMARK TEST SYSTEM

PRODUCT SUMMARY



Dolch 386 Pack

Company: Dolch Computer Systems, 2020 O'Toole Ave., San Jose, CA 95131; (408) 435-1881, (800) 538-7506, (800) 223-2077 in CA.

List Price: \$6,995.

Features: 20-MHz zero-wait-state 80386 CPU; two serial, one parallel, one video port; 80387 coprocessor supported.

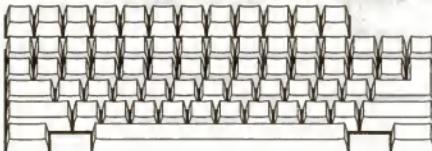
Storage and Memory: 40-megabyte MFM hard disk; 1.2-megabyte 5 1/4-inch floppy drives; 1 megabyte of RAM.

Support: One-year warranty.

Prec: Electroluminescent display; easy to use; fast.

Caveat: Smaller hard disk; reliability concern.

Summary: An impressively quick machine with good performance, outstanding display quality, and midrange price.



Micro Express

REGAL II

Micro Express, better-known for its inexpensive desktop computer line, has now entered the laptop computer market with its Regal line.

The Micro Express Regal II is a 386-based machine running at 20 MHz. It has a plasma display that emulates CGA. The Regal II uses 64K of cache memory to increase computation speed. It comes with the usual single serial and parallel ports. There is a video port for an external monitor. The motherboard in the machine has four expansion slots, but after installing the necessary hardware, there is only one half-length slot left. A 5½-inch, high-density floppy drive and a 40-megabyte hard disk round out the Regal II package.

Our Autobench CPU rating showed a fast 4.70, a very good rating. The hard disk sequential rating showed a 1.84,

which gives it a grade of satisfactory. Random hard disk access earned a very good with an index of 3.29. We were able to run this suite for 48 hours without trouble.

Our software compatibility suite gave the Regal II no problems. It has two processing speeds (20 and 8 MHz). As with other machines, emulation of colors on the plasma display didn't show well. The Regal II receives a grade of very good. Hardware compatibility was a problem due to the single slot and the fact that the access door covered the end of the only slot available. You could install a half-length modem, but you couldn't plug it in easily. We score hardware compati-

bility poor due to the lack of access to the available slot.

Micro Express ships the Regal II with a minimum of 1 megabyte of RAM, expandable to 10 megabytes. It meets our criteria for expandability but loses half a point for the lack of access to the usable 16-bit slot. We score a satisfactory for expandability.

Our view of Micro Express' preliminary documentation showed a well-laid-out design. We found adequate diagrams and substantial technical information on the computer. There are two large appendices containing extensive information. The table of contents was adequate, but the manual lacks an index. A step-by-

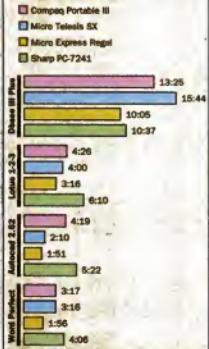
step start-up guide helps beginners. Documentation earns a good.

The Regal II has brightness and contrast controls for the plasma display. It also has a hardware power switch, which is easy to hit accidentally. There is a disk access light and a power light in the front panel. The plasma display is easy to read for text, but it doesn't do color emulation very well. Glare isn't a problem here. The keyboard was very light in weight and had a flimsy feel to it; but the keyboard plug is a standard full-size keyboard to work. Ease of use rates very good.

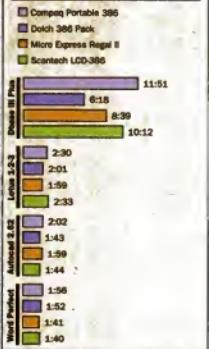
We found the case to be somewhat light in construction. The internal layout

InfoWorld Integrated Throughput Results

286 Portables



386 Portables



Figures refer to the time (in minutes:seconds) required to perform a suite of typical tasks in the particular programs. For more information on these tests, see product comparison of AT compatibles, July 25.



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was crowded and there were many wires that were not well-placed. There were no visible patches or last-minute changes. Putting a math coprocessor into this computer is like digging an open pit mine — make your dealer do it for you. Workmanship rates satisfactory.

Micro Express offers a 30-day money-back guarantee and a one-year warranty with the vendor's handling repairs. The vendor offers unlimited toll-free technical support. Support hours are 8:30 a.m. to 6 p.m. Pacific time. There is an extended warranty available at extra cost. Support policies rate a good.

Our contact with Micro Express' technical support lines produced mixed results. Some calls went right through and others produced a next-day callback. In all, we received satisfactory and polite answers to our questions. Technical support rates a satisfactory.

The Micro Express Regal II is a high-speed computer for any heavy-duty computing use. At \$3,999 it is one of the best 386-based values around. (DOS 3.3 and Basic cost \$79.) The standard box comes with 1 megabyte of RAM and a 40-megabyte hard drive. The plasma screen is a nice touch. We rate value very good.

Scantech

LCD-386

Scantech's LCD-386 is a fast performer that comes with an extra 64K cache boost and an impressive minimum of 2 megabytes of RAM on the motherboard.

As its name states, the LCD-386 has a liquid crystal display, and it is the clearest LCD we saw. The system is also shipped

with a 40-megabyte Seagate hard drive and a 1.2-megabyte, 5½-inch floppy drive. RAM can be expanded to 10 megabytes. The LCD-386's 20-MHz speed can be slowed down to 6 MHz if needed.

The LCD-386 ran through our Autobench tests with impressive speed. The CPU rated a 5.20 with cache, and a 4.70 without. The first rating puts the LCD-386 well into the excellent range. While sequential access came in at a relatively slow 1.40, random access sped along with a 3.23 rating. Sequential access earns a satisfactory; random access earns a very good.

We had only one small complication running our software compatibility suite on the LCD-386. Our first attempt at running Lotus under Windows 386 resulted in the system randomly rebooting. After much frustration we finally adjusted the dip switches on the machine and the program worked fine. The vendor spoke with Microsoft and determined that Windows 386 requires the cache to be disabled; after we did that, the test suite ran well. All of the other test programs worked fine, including Desqview with QEMM. These results, along with the LCD-386's two processing speeds, earn software compatibility a very good. On the hardware side, the LCD-386 ran with an ATI modem, Ethernet card, and Plus Development hard card. Hardware compatibility therefore earns a good.

The LCD-386 ships with one serial and one parallel port, two half-height mounting positions, and one free full-length 8-bit slot. The LCD-386 supports an 80387 math coprocessor, and we had no trouble setting up a NEC Multisync

monitor with the system. With the extra memory, expandability rates a very good, the best score of these portables.

Scantech includes the standard component documentation with its LCD-386 along with a user manual. The main manual is virtually identical to Dolch's with clear setup instructions and helpful diagrams. There is no troubleshooting for the machine, although the installation of some options is covered. The user manual has a table of contents and glossary but no index. Layout and text readability are average, and documentation earns a satisfactory.

The LCD-386 also has the same basic case as Dolch's 386 Pack. There are controls for reverse display, brightness, and screen tilt. Hard disk, power, and turbo lights are included along with a reset button. The 386 has the same keyboard as Dolch, with the small frustration of a misplaced escape key. (The vendor plans to offer a new keyboard sometime in November.)

We were impressed with the quality of Scantech's LCD screen. The glare and fading we found with the Sharp and Micro Telesis just aren't present with Scantech. Two or more people could read the screen fairly easily, and it does not need as much fine adjustment in contrast and tilt. Still, the LCD is a step down from the gas plasma and electroluminescent examples we saw. Overall, ease of use earns a good.

There were no visible patches on the interior boards of the LCD-386. Although the layout is tight, the cables and wires did not stand in the way of basic service to the machine. The case for the LCD-386 is also quite sturdy. Workmanship earns a good.

Scantech offers a one-year warranty on the LCD-386; a three-year extension costs \$495. The vendor will also offer BBS support in November. Repairs are handled through the vendor. Scantech maintains a technical support line from Monday through Friday from 7:30 a.m. to 5 p.m. Pacific time; it is not toll free. Support policies rate good.

The help we received from Scantech's

support line was accurate and prompt. Each time we called, the technician was courteous and knowledgeable about the product. We had no trouble getting through on the line. Technical support earns a good.

Although the LCD-386 is impressive in performance and features, it packs a hidden punch. The \$8,999 price tag — for LCD, 2 megabytes of RAM, 40-megabyte hard drive, DOS, and BBS — is the highest in our comparison by \$1,000. (Scantech offers a 20-MHz 286 for \$5,579.) The LCD-386 has more standard memory than most of its competitors, and like Micro Express, it offers 64K of cache. Without a gas plasma display, this is still a lot to pay even for the memory benefits. Value for the LCD-386 rates poor.

286 PORTABLES



Compaq

PORTABLE III, MODEL 40

Compaq's 286-model lunch box is the Portable III, the successor of the previous portable line. It is also the most expensive of the 286 portables.

The Portable III runs at 12 MHz. Our test unit came with 1.3 megabytes of memory and a 40-megabyte hard disk. The optional internal modem was installed. The unit comes with a plasma display that emulates a CGA display. This display doesn't emulate the CGA colors very well, but it's easy to read text. There is a single serial port, a parallel port, and an external video port. The Portable III uses a 5½-inch high-density drive.

Our 48-hour Autobench test showed a 2.03 CPU rating for the Portable III. This rating puts the machine in the middle range for 286 speed and earns a good. The hard disk sequential access came out at

PRODUCT SUMMARY



Compaq Portable III

MODEL 40

Company: Compaq Computer Corp., 20555 FM 149, Houston, TX 77070; (713) 370-0412.

List Price: \$5,799.

Features: 12-MHz 80286 CPU; one serial, one parallel, one video port; 80287 coprocessor support.

Storage and Memory: 40-megabyte hard disk; 1.2-megabyte 5½-inch disk drive; 640K of RAM.

Support: One-year warranty from dealers only.

Pros: Plasma display; solid reputation.

Cons: Price; no expansion slots in stock unit; poor support.

Summary: A reasonably fast machine with a good display, excellent construction, and a high price tag.

Power, Speed, Performance



Any Questions?

80386 Intel processor running at 20 MHz
1 mb 32 bit RAM upgradeable to 8 M.B. on motherboard
Socket for 80387 math coprocessor
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1.22, earning the Portable III a score of satisfactory. The random access rate was slightly higher, at 1.79. This is sufficiently high to earn the Portable III a good in random access.

The Portable III passed through our software compatibility suite with ease. We did notice that when colors were used in a program, the plasma display didn't show up well. The 12-MHz fixed speed was the only thing preventing a score of excellent. We rate software compatibility very good. In hardware compatibility, however, the score is poor, due to a lack of slots in the standard unit. As with its 386, Compaq does have an expansion box that adds two slots to the unit for \$199.

The minimum RAM supplied with the machine is 640K, expandable to 6.6 megabytes. The unit meets all of our expandability criteria, with one exception — the lack of slots. This lowers the expandability score to satisfactory.

Compaq's manual is up to its usual well-designed standard, with tabs neatly dividing the manual into sections, each of which has an individual table of contents. Photos complement the descriptions given in the manual, and there is an index. Step-by-step guides offer help to the beginner. Technical information is sparse. The manual earns a score of very good.

The Portable III has a front panel brightness control along with LED indicators for power and disk drive access, but there's no hardware reset button. The plasma display is reddish-orange in color and gives good contrast with text; glare isn't a problem with this display. The compact keyboard had the best feel of the portables tested, and the layout was comfortable. The function keys were along the top row, as in an AT-style keyboard. Some of the portables tested had the escape key by the numeric keypad. The Compaq had it in the normal position. Ease of use earns a very good.

A look inside the case shows a crowded but well-laid-out interior. Compaq uses the latest surface-mount technology in its circuit board construction. We saw no obvious patches or last-minute changes. Installing a math coprocessor is a cinch. Most of the other lunch box portables have the coprocessor socket buried deep down inside the computer, where it is difficult to reach. The Portable III's case is a sturdy built plastic exterior with an aluminum chassis for support. Workmanship earns a very good.

Compaq supplies a one-year warranty with the Portable III. An extended warranty plan is available as an option. Compaq uses its dealers for technical support and has no manufacturer technical support line. We give a score of poor, due to dealer support only.

We called dealers in our area and received satisfactory answers to our questions. Due to the lack of vendor-supplied support, we can only give a poor to technical support.

The Compaq Portable III has good speed and should be satisfactory for all uses except the most intensive. The Portable III, Model 40's \$5,799 price tag is very high for an AT-class machine. (A 20-megabyte version costs \$4,999.) It is durable in construction, and the plasma screen is a definite plus. We score it a satisfactory value.

Micro Express

REGAL

Micro Express' 286 portable is the Regal,

an AT-class portable computer running at a blazing 20 MHz. Its plasma display emulates a CGA card, and the video card can drive an external monitor. The machine comes with a parallel and a serial port, a 40-megabyte hard disk, and a 5 1/4-inch, high-density floppy drive.

We successfully completed our 48-hour Autobench test suite on the Regal. The CPU rating was the fastest of the 286s, at 3.75, which earned a very good score. The hard disk sequential score came to 1.82, a satisfactory score. The hard disk random index was 2.94, which earned a very good.

The software compatibility suite ran without problems and earned the Regal a

very good. We could only run the ATI modem and the Ethernet board, however. Hardware compatibility rates a satisfactory score.

Micro Express ships the Regal with 1 megabyte of memory, expandable to 8 megabytes. It has one 16-bit and one 8-bit half-height slot, one serial and one parallel port, and two half-height mounting positions. It will drive an external monitor and contains a position for an 80287 chip. The Regal meets our minimum qualifications for expandability and receives a score of good.

Micro Express' preliminary documentation for the Regal is virtually identical to that for the Regal II. The information is organized well, with adequate diagrams and substantial technical information. There are two large appendices containing extensive information. The table of contents was adequate but lacked a bit of detail; the manual also lacks an index. Documentation earns a good score.

The Regal's plasma display has both brightness and contrast controls. The hardware reset switch is in a somewhat exposed position and could be accidentally hit. The front panel contains power indicator lights and a disk access light. The plasma display has very readable text, but like other such displays in this comparison, it doesn't emulate colors very well. The display has a high contrast and glare is not a problem. The keyboard is very light and moves when you type on it. A bit more weight would help here. A possible solution is plugging a standard AT keyboard in. The Regal uses standard keyboard connectors. We rate ease of use very good.

The case is light in construction and could be a problem if the computer takes some bumps. The interior layout is, as you might guess, crowded. We didn't find as many hanging wires in this computer as we did in the Regal II 386 computer. There are no visible patches or laminate corrections visible on the Regal. Putting a math coprocessor in this computer is as difficult as in the 386-based Regal II. Workmanship scores satisfactory.

Micro Express offers a 30-day money-

back and one-year warranty with the vendor handling repairs. The vendor offers unlimited technical support. Support hours are 8:30 a.m. to 6 p.m. Pacific time. There is an extended warranty available at extra cost. Support policies rate a good score.

Our contact with Micro Express' technical support lines produced mixed results. Some calls went right through and others produced a next-day callback. In all, we received satisfactory and polite answers to our questions. Technical support rates a satisfactory.

The Micro Express Regal is a high-speed AT-class computer, by far the fastest 286 in this report. This one will do heavy-duty computing if a 386-based computer isn't required. We liked the plasma screen. With its \$3,399 retail price, the Regal is a good value.

Micro Telesis

SX

The Micro Telesis SX offers the lowest price for a 286 portable in our comparison — along with a 30-day, money-back guarantee.

The Telesis SX runs at 12 and 6 MHz with zero wait states and an LCD emulating CGA. Micro Telesis also provides a 20-megabyte Seagate hard drive, and a 5 1/4-inch, 1.44-megabyte floppy.

Earning a 2.08 in CPU access, the Telesis falls in the standard 286 speed range and earns a good. Sequential and random disk access were both less impressive, rating 0.99 and 1.27, respectively. Both access ratings earn a satisfactory. The Telesis was unable to run our 48-hour Autobench. These results are from our eight-hour test. We obtained a second unit to run our 48-hour benchmark, but it arrived with a defective hard drive.

Our software test suite ran without a hitch. Test results, combined with Telesis' two processing speeds, earn it a very good in software compatibility. The Telesis was able to run more of our hardware compatibility tests than most other portables. The ATI Modem, Intel

PRODUCT SUMMARY



Micro Express Regal

Company: Micro Express, 2114 S. Grand Ave., Santa Ana, CA 92705; (714) 662-1973.

List Price: \$3,399.

Features: 20-MHz, zero-wait-state 80286 CPU; one serial, one parallel, one video port; 80287 coprocessor support.

Storage and Memory: 40-megabyte MFM hard disk; 1.44-megabyte 5 1/4-inch floppy drive; 1 megabyte of RAM.

Support: One-year warranty.

Pros: Faster 286; money-back offer.

Cons: Light construction; Micro Express 386 is only \$600 more.

Summary: A blazing 286 with a good display and a fair price tag.

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320 MB-18 ms ESDI	\$7,399
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Every Dell system includes the Dell System Analyzer, a complete set of diagnostic tools. So troubleshooting is easy. In fact, most problems can be resolved over our toll-free support line. It's staffed by Dell's own expert technicians from 7 AM to 7 PM (CT) every business day. And there's no extra charge.

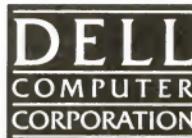
And if your system requires hands-on service, a Honeywell Bull technician will be at your location the next business day. At absolutely no charge to you.^a Because included in the price of your system is a full year of on-site service.

But that's not all. You're also protected by our 30-day money-back guarantee. And our one year limited warranty on parts and workmanship.^a

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Above Board, and Ethernet card all ran in the free full-length 16-bit slot provided. Unfortunately, the Plus Development Hard Card requires an 8-bit-only slot, so

it could not run. Nonetheless, hardware compatibility earns a good.

In expandability, the Telesis ships 640K of RAM standard on the motherboard, and it is expandable to 4 megabytes. The system has two parallel and two serial ports, three 3½-inch half-height mounting slots (one internal and two external), and one free 16-bit full-length slot. A monochrome or CGA monitor will run off of the RGB port provided, although we could not get the SX to recognize our NEC Multisync EGA. We called tech support, and they suggested new DIP settings; these didn't work. The next time we called, the tech said that the machine must not run the Multisync, and suggested that we use a mono or CGA monitor. An 80287 math coprocessor can also be installed on the Telesis motherboard. Expandability earns a good.

We received several bits of OEM documentation with the Telesis, including some details on the disk controller, motherboard, and floppy drive. For the Telesis system itself there was a small, photocopied user's manual covering setup and basic technical specifications. There were a few diagrams showing basic system parts, along with some internal components. Aside from this, the documentation has a table of contents but no index or glossary. We feel that Micro Telesis provided the bare minimum for its system. Documentation earns a satisfactory.

Telesis' front panel contains a turbo button, contrast control, and reset button. There are also indicator lights for power on/off, hard disk access, and turbo mode.

There is an LED readout indicating the system's present clock speed. The Telesis sports a deep-blue LCD. The screen is larger than some of the others tested, approximately 9 by 6 inches, instead of the common 9 by 4 inches. While the larger screen area is a plus, the blue LCD tone is a definite minus. It is very difficult for more than one person to read the screen at the same time. When viewing the screen from the side of the machine, the images fade or disappear, making the Telesis a poor choice for product demonstrations. Even when using the Telesis individually, we found ourselves frequently adjusting the contrast or the screen tilt.

Another frustration came when hooking up an external monitor. According to technical support, you must first disconnect the internal LCD plug before installing a monitor. This requires opening the back of the machine (no small feat on this unit), pulling the LCD plug, then putting it all back together and cabling the new monitor. The Telesis SX keyboard is fairly standard with the exception of a misplaced escape key. The frustrating display and difficult procedures for external monitor installation drop ease of use to poor.

Once we got past the eight back-panel screws, we found no last-minute wiring or patches on its internal boards. Getting into the machine took major effort; most portables have just three easily accessible screws. The serial and parallel ports for the Telesis are lined along the top edge of their video card. The card is braced by three screws that come in through the

back of the machine. This adds additional hassle to taking off the back cover. In addition, if the screws aren't in place, the card is not stable. It would have been nice to see the board braced on the inside rather than by external screws. While this arrangement may be good in theory, Micro Telesis does not pull it off in the design of its machine. The failure to run the 48-hour Autobench raises questions about reliability and contributes to a poor score in workmanship.

When it comes to support policies, Micro Telesis strikes gold. They offer a 13-month warranty on the Telesis SX along with a 30-day, money-back guarantee. Micro Telesis also handles repairs with a 48-hour turnaround time promised. An extended warranty is available for one year at 8 percent of the purchase price. There is a technical support line maintained from Monday to Friday 8 a.m. to 5 p.m. Pacific time, although Micro Telesis does not offer a toll-free number. Overall, these impressive support policies earn a very good.

Micro Telesis' technicians were courteous and prompt in their responses. On our call for setting DIP switches for the Multisync, however, we were given incorrect settings for the monitor. Because of this initial misinformation, Telesis' technical support earns no higher than satisfactory.

For \$1,899 — with LCD, 640K, 20-megabyte hard drive — it is hard to resist the Telesis SX. (DOS 3.3 and Basic cost \$85; a gas plasma display option is \$500; and you can get an external chassis that you can insert any 3½-inch floppy drive into for \$49.) A money-back guarantee adds to this system's appeal, but the poor readability of the LCD and the reliability concerns might frighten some buyers. Micro Telesis' price just can't be beat; we rate value good.

PRODUCT SUMMARY



Micro Telesis SX

Company: Micro Telesis Inc., 1260 Lomax St., Suite A-2, Costa Mesa, CA 92626; (714) 557-2003.
List Price: \$1,899.

Features: 12-MHz, zero-wait-state 80286 CPU; two serial, one parallel, one video port; 80287 coprocessor support.
Storage and Memory: 20-megabyte Seagate MFM hard drive; 1.44-megabyte 3½-inch floppy drive; 640K of RAM.

Support: 13-month warranty.

Price: Money-back offer; least expensive portable.

Cons: Poor LCD; smaller hard disk; reliability concern.

Summary: Terrific value if the display doesn't hold you back.

REPORT CARD

80386 Portable Computers

(InfoWorld weighting)	(Your weighting)	Compaq Portable 386	Dolch 386 Pack	Micro Express Regal II	Scantech LCD-386
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Performance

CPU Speed	(75)	()	Very Good	Excellent	Very Good
Hard disk access, sequential	(50)	()	Satisfactory	Very Good	Satisfactory
Hard disk access, random	(50)	()	Good	Very Good	Very Good
Software compatibility	(150)	()	Very Good	Very Good	Very Good
Hardware compatibility	(125)	()	Poor	Satisfactory	Poor
Expandability	(75)	()	Satisfactory	Satisfactory	Satisfactory
Documentation	(50)	()	Very Good	Satisfactory	Good
Setup	(50)	()	Very Good	Very Good	Very Good
Ease of use	(50)	()	Very Good	Excellent	Very Good
Serviceability					
Workmanship	(50)	()	Very Good	Poor	Satisfactory
Support policies	(50)	()	Poor	Good	Good
Technical support	(100)	()	Poor	Good	Satisfactory
Value	(125)	()	Satisfactory	Satisfactory	Very Good
Final scores		5.4	6.4	6.0	6.3

Use your own weightings to calculate your score

GUIDE TO REPORT CARD SCORES

InfoWorld reviews only finished, production versions of products, never beta test versions.

Products receive ratings ranging from unacceptable to excellent in various categories. Scores are derived by multiplying the weighting (in parentheses) of each criterion by its rating, where:

Excellent = 1.0 — Outstanding in all areas.

Very Good = 0.7 — Meets all essential criteria and offers significant advantages.

Good = 0.625 — Meets essential criteria and includes some special features.

Satisfactory = 0.5 — Meets essential criteria.

Peer = 0.25 — Fails short in essential areas.

Unacceptable or N/A = 0.0 — Fails to meet minimum standards or lacks this feature.

Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 10 (plus bonus). Products rated within 0.2 points of one another differ little. Weightings represent average relative importance to InfoWorld readers involved in purchasing and using that product category. You can customize the report card to your company's needs by using your own weightings to calculate the final score.

INFO WORLD

Sharp PC-7241

Company: Sharp Electronics Corp., System Division, Sharp Plaza, Mahwah, NJ 07430; (201) 529-9500.
List Price: \$4,495.

Features: 10-MHz, zero-wait-state 80286 CPU; one serial, one parallel, one video port; 80287 coprocessor support.

Storage and Memory: 40-megabyte hard drive; 1.2-megabyte 3½-inch floppy drive; 640K of RAM.
Support: One-year warranty.
Price: Very competitive; small; three processing speeds; easy to use.
Cons: Price; poor drive access rating; frustrating technical support.
Summary: Comfortable machine that just can't overcome its price or performance limits.



Sharp PC-7241

Company: Sharp Electronics Corp., System Division, Sharp Plaza, Mahwah, NJ 07430; (201) 529-9500.
List Price: \$4,495.

Features: 10-MHz, zero-wait-state 80286 CPU; one serial, one parallel, one video port; 80287 coprocessor support.

Storage and Memory: 40-megabyte hard drive; 1.2-megabyte 3½-inch floppy drive; 640K of RAM.
Support: One-year warranty.
Price: Very competitive; small; three processing speeds; easy to use.
Cons: Price; poor drive access rating; frustrating technical support.
Summary: Comfortable machine that just can't overcome its price or performance limits.

tion of a Plus Development Hard Card as its 40-megabyte hard drive. This saves some space inside and makes the unit a little slimmer than some of its competitors. On the other hand, this system's overall speed and access time was the slowest tested.

The PC-7241 runs at 6.8, and 10 MHz with zero wait states. Along with the hard drive, the system has a high-density 5½-inch floppy drive and comes with 640K of RAM. A backlit LCD rounds out the PC-7241's basic features. If you want to take the office with you, there's even a thermal transfer printer that snaps onto the back of the case.

In our Autobench program, the PC-7241 rated a 1.65 in CPU access. This places it into the satisfactory range, an unimpressive accomplishment for a 10-MHz machine. Access ratings for the 40-megabyte drive weren't any higher. Sequential access at a 0.71 earns a poor. Random access is a bit higher at 1.47 and earns a satisfactory.

Running the software programs in our compatibility suite posed no problems on the PC-7241. Each program and the respective test files ran completely, and the machine offers three clock speeds. Software compatibility earns an excellent. We installed our ATI modem, Plus Development Hard Card, and Ethernet cards into the Sharp without difficulty, and each ran fine. The Intel Above Board could not be installed since Sharp only offers an 8-bit slot. Hardware compatibility earns a good.

Although the PC-7241 comes with 640K, it is only expandable to 1.6

megabytes. There is one parallel and one serial port, one half-height mounting position, and one full-length 8-bit slot. The PC-7241 drove our NEC Multisync without any problems. Sharp offers an additional expansion box for \$699. It carries two 16-bit and two 8-bit slots. With the limited memory expansion, expandability drops to a poor.

The documentation for the PC-7200 comes in an attractively bound, three-ring binder complete with index tabs. The instructions are geared toward the novice user, with ample illustrations depicting the computer, its ports, and its peripherals. The troubleshooting section contains an informative chart with symptoms and possible causes. A table of contents, an index, and a glossary round it out. The only items lacking are a quick-reference card and a short setup section for experienced users. Documentation earns a good score.

The front and back panels of the PC-7241 are loaded with various controls and adjustments. On the front are power, screen standby, floppy drive, and hard disk lights along with contrast and brightness controls, inverse video switch, and a tilt control. There is no reset button for the PC-7241. The back panel sports switches to set processing speed, CGA or monochrome emulation, the speaker volume, and internal or external monitor. All of the back panel switches are unique to this portable and very handy.

The PC-7241 has a screen similar to, but smaller than, the screen on the Telisis SX. It is LCD with a blue tint. We found some of the same problems with it as we

did on the Telisis SX. It is difficult for more than one person to view the screen, and even a single user has to frequently adjust contrast or tilt. Sharp's keyboard has a unique layout, with the function keys smaller in size than the rest of the keys. This could be a little frustrating when using programs that are function-key intensive. There is also a setup key on the upper right that brings up a setup menu, which allows you to select and change your printer and serial ports, underlining, power-up alarm, backlight timeout, and clock, among others. Overall, the helpful exec controls outweigh the hindrances of the screen. Ease of use earns a good.

There were six last-minute patches and extra wires on the PC-7241 motherboard, as well as a patch of them on the controller card. The motherboard is set at the rear of the machine, so it is easier to access than those on the other portables we tested. Sharp's case is sturdy, with adequate clips to hold the keyboard in place while transporting the unit. The patches on the internal boards are offset by the convenient motherboard position; we rate workmanship satisfactory.

Sharp offers a one-year warranty on the PC-7241. The company handles repairs through four domestic repair depots and offers a toll-free support line. Technical support is available from 9 a.m. to 5 p.m. Eastern time.

There are several extended warranties available at extra cost. Support policies earn a good.

We failed to get through on the Sharp technical support line. Several times we

were put on hold for over seven minutes, without a chance to leave a message. Other times we repeatedly received a busy signal. Due to our inability to reach Sharp, technical support rates unacceptable.

Sharp has the second highest price of the four 286 machines tested. At \$4,495 (LCD, 640K RAM, 40-megabyte hard drive, DOS, and Basic), it also offers inferior performance compared to its competition. Frustrating technical support adds to its problems. Even the solid scores in ease of use and compatibility can't bring its value higher than poor.

Executive Summary

For the 386s we tested, prices varied by \$5,000. That span ranges from very good to poor in value.

At the head of the value field was the runaway price leader: Micro Express Regal II, which costs just \$3,999 and beats its nearest competitor by \$3,000. It comes with a nicely readable gas plasma display; the only major trade-off for the great price is in hardware compatibility.

The Dolch 386 Pack tied for fastest machine tested, finishes second in price, is easy to use, and offers the best display. It is a solid performer that outpoints Compaq on our report card. But the Dolch failed our 48-hour Autobench, which raises a reliability question. The vendor says it is correcting power supply problems.

The Compaq Portable 386 has a well-deserved reputation for durability and performance. However, dealer support is spotty, you'll need to buy an add-on to get more slots, and its merits don't come cheap. The Compaq costs \$2,000 more than the Dolch, but without significant advantages.

At a staggering \$8,999, the Scan-tech LCD-386 offers great performance, but the price is indigestible.

The 386 among our price spectrum varied by \$3,900, also ranging from very good to poor in value.

You can practically steal the Micro Telisis SX — it costs just \$1,899. It generally operates well and has a money-back guarantee. On the flip side, the Micro Telisis has the disadvantage of a poor display, it's a struggle to attach another monitor, and it also failed our 48-hour Autobench, which questions its reliability. However, it's \$1,500 cheaper than the next 286.

The highest scoring 286 machine on our report card is the Micro Express Regal, a 20-MHz unit that offers the best overall package, with a money-back guarantee, and superior display and performance over the 286 SX.

The Compaq Portable III, like its 386 sibling, is a capable, sturdy unit with a good display. Like the 386, you must reach your dealer for support, there are no slots, and it carries a high price: \$5,799 — you could get Micro Express' 386 for \$1,800, less.

For \$1,300 less you can buy the Sharp PC-7241, an easy-to-use compact unit that earned the best compatibility ratings of any unit in this comparison. However, it is the slowest machine we tested, and technical support was unreachable.

REPORT CARD

80286 Portable Computers

	(InfoWorld weight)	(Your weighting)	Compaq Portable III	Micro Express Regal	Micro Telisis SX	Sharp PC-7241
Performance						
CPU speed	(75)	()	Good	Very Good	Good	Satisfactory
Hard disk access, sequential	(50)	()	Satisfactory	Satisfactory	Satisfactory	Poor
Hard disk access, random	(50)	()	Good	Very Good	Satisfactory	Satisfactory
Software compatibility	(150)	()	Very Good	Very Good	Very Good	Excellent
Hardware compatibility	(125)	()	Poor	Satisfactory	Good	Good
Expandability	(75)	()	Satisfactory	Good	Good	Poor
Documentation	(50)	()	Very Good	Good	Satisfactory	Good
Setup	(50)	()	Very Good	Very Good	Very Good	Very Good
Ease of use	(50)	()	Very Good	Very Good	Poor	Good
Serviceability						
Workmanship	(50)	()	Very Good	Satisfactory	Poor	Satisfactory
Support policies	(50)	()	Poor	Good	Very Good	Good
Technical support	(100)	()	Poor	Satisfactory	Satisfactory	Unacceptable
Value	(125)	()	Satisfactory	Good	Good	Poor
Final scores			5.3	6.3	5.8	5.0

Use your own weightings
to calculate your score

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Satisfactory = 0.5 — Meets essential criteria.

Peer = 0.25 — Falls short in essential areas.

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Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 10 (plus bonus). Products rated within 0.2 points of one another differ little. Weightings represent average relative importance to InfoWorld readers involved in purchasing and using that product category. You can customize the report card to your company's needs by using your own weightings to calculate the final score.

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286-12 Desktop	\$1899	\$1049	\$1499	\$1749	\$700	\$300

DESKTOP COMPUTERS

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- 80386 processor running at 20 MHz
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- Socket for 80387 math co-processor
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- 101-style keyboard

ME 286-20 \$1899

- 80286 Processor running at 20 MHz
- 1 MB of RAM upgradable to 8 MB on Main Board
- Zero Wait State Operation on Memory
- Page Mode Interleave Memory
- LIM (Lotus-Intel-Microsoft) 4.0 support for Memory over 1 MB
- Socket for 80287 Math Co-processor
- Real Time Clock/Calendar with CMOS RAM and Battery Back-up
- Microsoft DOS and OS/2 compatible
- High Performance NCL Floppy/Hard Disk Controller*
- 1.2 MB Floppy Disk Drive (1.44 MB or 360K options at no extra cost)
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For Each Additional Meg of RAM Add \$950

ME 286-12 \$899

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- 8 I/O Expansion Slots
- CMOS Clock/Calendar Circuit
- Socket for 80287 Math Co-Processor
- NCL Floppy/Hard Disk Controller* (SCSI optional)
- 1.2 MB Floppy Disk Drive
- AT-style Keyboard

PORTABLE COMPUTERS

Regal II (Gas Plasma Display) \$3999

- 80386 Processor running at 20 MHz
- 1 MB of RAM (Expandable to 10 MB using Piggy-Back Board)
- Zero Wait State Operation
- 64K of Cache implemented with 35/40ns Static RAM
- Socket for 80387 Math Co-Processor
- Norton S.I. Rating of 23
- AMI Bios with Set-up and Diagnostics in ROM
- 640 x 400 Super High-Resolution Gas Plasma Display
- 80 characters x 25 lines
- Software Switch between Monochrome or Color Graphics Softwares and Mono, Color, EGA or Gas Plasma Screens
- High Performance NCL Floppy/Hard Disk Controller*
- 1.2 MB Floppy Disk Drive (1.44 MB or 360K Free Replacement option)
- 40 MB Fast Access Hard Disk (80 MB optional)
- Serial and Parallel Ports
- Ports for External Monochrome, Color or EGA Monitor
- Will Run Color Softwares on EGA Monitor
- One Available Slot
- 12-function Keyboard

For 80 MB Hard Disk Add \$950



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- Socket for 80287 Math Co-Processor
- Real Time Clock/Calendar with CMOS RAM and Battery Back-up
- Microsoft DOS and OS/2 compatible
- Five Expansion Slots (3 16-bit, 2 8-bit)
Two Available: 1 16-bit, 1 8-bit
- 640 x 400 Super High-Resolution Gas Plasma Display
- 80 Characters x 25 Lines using Software Switch between Monochrome or Color Graphics and Monochrome, Color, EGA or Gas Plasma Screens
- High Performance NCL Floppy/Hard Disk Controller*
- 1.2 MB Floppy Disk Drive (1.44 MB or 360K optional at no extra cost)
- 40 MB Fast Access Hard Disk (up to 380 MB available)
- Serial and Parallel Ports
- 12-function Keyboard
- One Year Warranty on Parts and Labor

- AMI Bios with Set-up and Diagnostics in ROM
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- 11-inch Screen, 80 Characters x 25 Lines
- Port for External Monochrome, Color, or EGA Monitor
- Will Run Color Softwares on EGA Monitor
- Two Available Expansion Slots (Both Long: 1 16-bit, 1 8-bit)
- High Performance NCL Floppy/Hard Disk Controller*
- 1.2 MB Floppy Disk Drive (1.44 MB or 360K Free Replacement option)
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- Real Time Clock/Calendar with CMOS RAM and Battery Backup
- Microsoft DOS and OS/2 Compatible
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- 11-inch Screen, 80 Characters x 25 Lines
- Six Expansion Slots Available: Two Long, One Short
- High Performance NCL Floppy/Hard Disk Controller*
- 1.2 MB Floppy Disk Drive (1.44 MB or 360K options at no extra cost)
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- 12-function Keyboard
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- One Year Warranty on Parts and Labor

For 80 MB Hard Disk Add \$950
For 80 MB Hard Disk Add \$900

Roadrunner Plus \$3399

- 80386 Processor running at 20 MHz
- 1 MB of RAM (Expandable to 10 MB) using Piggy-Back Board
- Zero Wait State Operation
- 64K of Cache implemented with 35/40ns Static RAM
- Socket for 80387 Math Co-Processor
- Norton S.I. Rating of 23

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Prices, specifications and availability subject to change without notice.

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FIRST LOOK • By MICHAEL J. MILLER

System Sleuth Tracks Down Hardware/Software Conflicts

Have you ever suspected that two terminate-and-stay-resident (TSR) programs were conflicting, but weren't quite sure? Or wondered what addressed were free, so you could insert a new I/O card? Or have you ever just wondered what was going on with your system?

If so, a new program called System Sleuth may be just what you've been looking for. It's a great tool for technical analysis of your hardware.

Simply put, System Sleuth analyzes what's in your computer, covering everything from memory to add-in boards to disk drives.

When you start the program, it gives you an overview of the entire system, listing the processor and BIOS types, the version of DOS, and the number and location of the serial and parallel ports, as well as an overall listing of memory locations showing which ones are occupied by DOS, EMS page frames, video memory, and I/O cards.

From there you can move to various detail screens, with more information on the disks, memory, video, and I/O cards.

For instance, it can tell you the formatting details of your hard disk, the number of files and directories, the structure of the File Allocation Table, and the number of copies of the FAT the machine keeps. System Sleuth is meant as an analysis tool, so it doesn't do anything

that could be destructive, such as reformatting or defragmenting your disk.

Display information includes the type of display adapters attached or emulated (an EGA emulates a CGA; a VGA both an EGA and CGA) and the kind of monitor attached, as well as more technical information on the particular video modes supported and the amount of video memory.

The program has various screens showing the contents of the system's memory. An initial screen tells you how much conventional, extended, and expanded memory you have in your system and available, as well as the type of EMS the machine has and the location of the EMS page frame.

One of the more useful screens is a list of TSR programs, where they are situated in memory, and what interrupts they hook. Similarly, a device chain shows you what your driver cards and when they loaded in memory. All these can be quite helpful when you are trying to figure out if various programs are conflicting, or why you don't have enough memory to load another program.

If you're trying to install a new card, the I/O card area information is quite useful. System Sleuth lists which memory addresses for I/O cards are in use, and tries to read the copyright notice for each card so you can tell which card is using which addresses. (One potential problem: this screen only lists physical cards, not EMS page frames.) You can also examine

the contents of any location of memory, and view that in ASCII or Hexadecimal.

All this information is interesting, but it may not be useful unless you know what it all means. For instance, some interrupts can be easily shared by many devices; other interrupts cause trouble when they are shared. System Sleuth tries to assist with on-line help, including

technical reference manual, which it will send to registered users.

When you're finished analyzing a machine, the program can produce reports showing the details of each individual section or all of the sections. You can add your own header to each page, and include up to 15 lines of notes or technical support information.

A couple of caveats: System Sleuth is not a diagnostic tool, so it won't show you if any parts of the machine aren't working right. And although System Sleuth runs under multitasking operating environments (such as Desqview or Windows), you might get misleading results because those environments routinely map information from one part of memory to another as they switch among programs.

Still, I can easily imagine that someone supporting a number of machines might just add System Sleuth to his or her grab bag of tools to help analyze those machines when trouble strikes; you can run the program from a hard disk, or just from a floppy. You might even want to print, for your records, reports for each machine you support.

The \$149 program requires an IBM PC or compatible and is available now from DTG Inc., 23704-5 El Toro Road, Suite 348, El Toro, CA 92630; (213) 987-2000.

First Look examines new personal computer products before they have been through a formal review.

"Someone supporting a number of machines might use System Sleuth to analyze machines when trouble strikes."

tutorials on such things as system interrupts and TSRs (telling you how those programs work) and tables showing common interrupts and what they do, system board switches, I/O port addresses, and device attributes.

The program comes with a rather simple manual, but the vendor says it will prepare a more complete and detailed

SpinRite Will Speed Up Your Hard Disks, or Your Money Back!

Show me a person who doesn't want his hard disks to run faster, and I'll show you a lonely guy!

Last year when I was researching a *TechTalk* column on hard disk interleaving, I discovered that nearly 100% of the hard disks in the world are *not interleaved correctly*. This misinterleaving decreases your hard disk data transfer rate by 50% to 600%

Responding to the need for a simple method of resetting any hard disk's sector interface, I developed SpinRite, the world's first non-destructive low level hard disk reformatter. SpinRite optimizes any hard disk's interface without disturbing its data. It also renews the disk's low-level formatting in a matter of minutes and prevents the accumulation of bad sectors and all miscellaneous hard disk data errors.

The first time you run SpinRite, your hard disk drives will be tuned up for absolutely maximum performance, their surfaces will be polished by more than 5 Gigabytes of worst-case test patterns, every surface defect will be found and isolated, and all areas which were never really bad in the first place will be returned to full active use.

I believe that if you then re-run SpinRite two or three times each year SpinRite's low-level format renewal will eliminate all preventable data loss on your hard disk drives - forever.

With well over ten thousand hard disks now being managed by SpinRite, we're becoming increasingly confident of SpinRite's significance to the industry.

I'm so certain that you'll go nuts over this product that I'm offering you this simple guarantee, in addition to our standard 30-day unconditional money back satisfaction guarantee:

If SpinRite does not significantly speed up your hard disks, you are invited to return it for a prompt (and somewhat surprised) immediate refund.

I really want you to give this product a try. I know you'll be as amazed and impressed as our many thousands of first customers who have made SpinRite a part of their life.

Aside from being told how great the product is, we've received much appreciation for pricing SpinRite at just \$59. (Our customers tell us we could get much more.) — Steve Gibson.

SpinRite is immediately available from:

**Gibson Research Corporation
22991 La Cadena
Laguna Hills, CA 92653
(714) 830-2200**

Please send a check for \$59 plus \$1.50 shipping and handling, or request UPS COD. Credit Card Orders can not be accepted at this time. California residents please include 6% state sales tax... and thanks for your order!

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I certify that the statements made by me above are correct and complete.

Michael McShane,
Distribution Manager

IMPRESSIONS

The screenshot shows a software window titled "PC Yellow Page". It has a menu bar with "File", "Edit", "View", "Search", "Help", and "Exit". Below the menu is a toolbar with icons for "New", "Open", "Save", "Print", "Find", "Replace", "Copy", "Cut", "Paste", "Delete", "Select All", and "Exit". The main area contains a scrollable list of business names and their contact information. A sidebar on the right lists various categories such as Color Separations, Colors & Pigments, Communication Services, Service/Investment Services, Communication Equipment, Communications Consultants, Communications Data, Compact Discs, Sets, Books, Tapes & Discs, Compressors, Computers - Personal, Computer Components, Sets, Computer Eq., Supp., Peripherals, Computer Graphics, Computer On-Line Services, SeeAlso Information Processor, Computer Renting & Leasing, Computer Repair & Service, Computer Room Installation.

PC Yellow Pages contains a scrolling index of 800-number businesses.

■ PC YELLOW PAGES

Phone List Application Is Great Idea, But Suffers From Annoying Quirks

PC Yellow Pages is a great idea — instant access to a collection of business names and phone numbers, sorted by business type — but the implementation of the idea is flawed.

At first glance, it seems to be a bargain, with 15,000 names and phone numbers and 5,000 addresses for \$99.95. That's less than 7 cents apiece, a reasonable price considering you also get software to manage the list, including mail merge and auto-dialing if you have a modem. Calling information for individual numbers would cost more. The program has pop-up windows, color, and graphics, and indexes are held in memory, which makes access quick.

Unlike most applications, the information in this software has greater value than the application itself. The names, phone numbers, and addresses are the critical part, especially since the big cost of using this data will be in the time and money spent on telemarketing or direct mail to the companies on the list.

That's why it was disappointing to find a lack of quality control readily apparent in the data. In five minutes I found 10 errors, including IBM spelled "International Business Machn." The street name for Autodesk was spelled wrong, and Avenue and aviation were also misspelled.

PC Yellow Pages' interface is attractive, with some nice touches such as automatic scrolling when you type the first few letters of an entry you're seeking. But again, there are annoying quirks. The Escape key backs you out of menus, but it doesn't abort a botched entry; it just enters a blank record, which then has to be manually deleted.

With this issue, InfoWorld starts a new section, called Impressions, in which individual staff members take a quick look at new and unreleased products and at products that we would not otherwise review. Unlike First Looks and Short Looks, these impressions are based on demonstrations and limited hands-on experience, rather than detailed testing and evaluation. Each represents the opinion of the individual writer.

Export of data to a mail-merge file is painless, though there's no way to simply dump everything, which enables the merging of data with an existing database. The program will print labels and index cards, and merging with a letter in Microsoft Word was easy, as was importing into Database from the mail-merge format. One of the most difficult list-maintenance problems — detection and deletion of duplicates — doesn't seem to be addressed in the software.

Digital Publications says it is working on a new version that addresses the current version's problems.

The application is limited to 10,000 toll-free business numbers and 5,000 local numbers, sorted by area code. Additional area code lists cost \$29 each.

Digital Publications Inc., 5390 Peachtree Industrial Blvd., Suite 105, Norcross, GA 30071; (800) 777-1470.

— Nick Arnett

■ PRIVATE EYE

Monocular Video Screen Virtually Puts Brain On-Line

Private Eye looks like something out of the movie "Brainstorm" — it puts a video representation of your computer output in front of your eyeball in the same way that the eyepiece on a video camera shows the cameraman the scene he is shooting. The difference with Private Eye is that beyond the monocular eyepiece that weighs only a few ounces, there is no serious weight or tether to the near-Hercules resolution (720 by 280). Peering with one eye into a 1.2-inch-by-3.2-inch eyepiece that is strapped to a headset, your other eye is free to observe the real world. You can even compare real objects to images in the eyepiece.

Reflection Technology showed us a prototype of the device, but the results were impressive. It took approximately one minute for me to adjust my eyes to it, and my glasses did not seem to present any problem in viewing the image. The image of a spreadsheet appeared crystal-clear in a vibrant, non-straining red. The

■ PROMPT

Perplexing Windows File Manager In Dire Need of a Second Version

One of the trade-offs of using Microsoft Windows is putting up with the DOS Executive, the abysmal file manager supplied with Windows. The field is wide open for a better file manager to run under Windows. Prompt, from Access Softek, isn't quite it.

Prompt (\$79) provides the same file handling commands as the Executive and adds a directory tree and some unique features, including a Library.

The Search function has the special feature of accumulating results from search to search, which can be useful in combination with the Library function. The Library allows you to define subject names and then tell Prompt to associate that subject with a selection of files, such as the set of files you just accumulated in the Search window.

Unfortunately, this program does not use menus in a normal fashion. Three of the menus are actually buttons that call

up dialog boxes. It is these boxes that contain nearly all the actual commands.

The notable exceptions are the commands to create and delete directories, which were nowhere. The documentation explains that to create a directory, you must open the Tree view, point at the parent-to-be directory, and drag to the right. Deleting a subdirectory seemed impossible; a call to technical support revealed that in fact it is impossible. Prompt, Version 1.0 simply does not let you delete subdirectories.

Overall, this program cries out for a second version. The Tree view is a overdue addition to Windows file handling, and the Library is a fine idea. As Version 1.0 stands, however, it isn't much better than the Microsoft Executive, and in its tendency to perplex, it is at times worse.

Access Softek, 3204 Adeline St., Berkeley, CA 94703; (415) 554-0116.

— Thomas Cox

■ EVERY OVERHEAD TRANSPARENCIES

Avery Product to Make the Creation Of Presentation Graphics Easier

Whenever I give a presentation, I like to use overheads. With desktop presentation programs (such as Powerpoint, Clicker Presents, Standout, More II, and Xerox Presents) and the increasing popularity of presentation graphics programs, it's becoming easier to design a presentation on-screen. Typically, I've printed the results on paper in a laser printer, then copied from the laser printer onto transparencies.

Avery has a better solution with its Overhead Transparencies for Desktop Laser Printers, which are specifically designed to travel through laser printers without jamming. The transparencies go through the printer with a paper backing that is removed after printing. I've tried this out and found it simple and easy. It worked smoothly and the transparencies looked good.

The transparencies are available in a file package with 20 transparencies for \$11.85, or in a box of 50 for \$25.76.

Avery Commercial Products Division,

818 Oak Park Road, Covina, CA 91724; (800) 541-5507.

— Michael J. Miller

tiny screen appeared to be several feet in front of the eye, and you can read a document at normal reading distance with the other eye.

There was a slight sound and movement from some sort of internal vibration in the device (the vibration comes from part of its proprietary optical technology), but it is not really a distraction. Apparently this is being cleared up by the vendor. Since the demonstration lasts only a few minutes, there is no way to gauge the effects of long-term, steady usage of this new technology on human vision, but we doubt if it will be much worse than staring into a full-size monitor all day.

The many applications that spring to mind for this kind of device will especially be possible if, as Reflection Technology asserts, Private Eye appears at retail prices under \$100.

We suspect there are applications for this technology that have not yet been imagined by its MIT-based inventors. Where the mouse brought us the era



Private Eye provides a one-eyed view.

of point-and-click, this may take us into the era of decisions based upon comparison of real and ideal images.

Reflection Technology, 171 Third St., Cambridge, MA 02141; (617) 547-2422.

— Martin Marshall

REVIEWS



Compaq's 20-MHz 386/20e can handle up to 16 megabytes of 32-bit RAM without using a slot. This leaves all four AT-compatible 16-bit slots open for options.

FEATURES: Everybody's doing it — offering a downsized version of their regular desktop-hogging computers. Now Compaq joins in with the Compaq 386/20e, also known as the Horizon, 30 percent smaller but with the same power as the hefty Compaq 386/20 it replaces. The main trade-off is in the smaller system, which has four slots instead of six.

COMPAQ 386/20e The Compaq 386/20e features the Compaq Flex Architecture, which separates memory from peripherals so that 32-bit memory access can occur as fast as possible, while still providing 8- and 16-bit standard-bus slots.

A 20-MHz 80386 chip sits at the heart of the system. One megabyte of 80-nanosecond RAM is standard, with performance improved using 32K of 35-nanosecond RAM controlled by an Intel 82385 high-performance cache controller. Floating point can be enhanced by installing either an Intel 80387 coprocessor or the Weitek 3167 coprocessor.

Like its predecessor, the 20e comes with a 1.2-megabyte floppy drive. Compaq also offers versions of the system with a 40-megabyte 29-nanosecond hard disk or a 110-megabyte 25-nanosecond hard disk. (The regular-size Compaq 386/20 uses a 60-megabyte drive as its minimum configuration.) The 386/20e controller offers 1:1 interleaving to improve sequential access performance. You can add a 360K, 1.2-, or 1.44-megabyte floppy drive or tape backup of 40- or 135-megabyte capacity.

Need more hard disk space? You can add 300 or 600 megabytes using the Compaq Fixed Disk Drive Expansion unit.

The system board has all the common interfaces built into it: one serial port, one parallel port, a VGA controller, keyboard port, and auxiliary (mouse) port. It also has the floppy and hard disk controller built on. Memory sits on a board in its own special slot, which leaves all four 8-/16-bit slots on the system board open. (The now-discontinued, larger 386/20 offered two additional 8-bit slots. This and the larger minimum hard disk drive are the only functional differences between the two systems.)

Compaq provides a LiM 3.2 (not 4.0) memory manager and a disk cache program with the system. MS-DOS 3.11, OS/2, and Xenix/386 are available separately. The keyboard uses the standard enhanced AT-style layout.

PERFORMANCE:

The Compaq Desktop 386/20e has all the power of its older and larger brother, yet this zippy workstation takes less space.

When we ran the InfoWorld Auto-bench Hardware Benchmark System 2 on the 386/20e, it reported the same CPU index (5.4) as the Compaq 386/20 — as we expected. Sequential hard disk access on the Compaq 20e's 40-megabyte drive was a swift 3.6, compared to the older system's mere 1.4 on its 60-megabyte drive; the random hard disk access index was 2.9 compared to the other system's 3.7.

Hard disk performance has been steadily improving; the improved con-

A Smaller Compaq System That Packs the Same Punch

The 386/20e trades off two slots for a smaller footprint and all the power of a full-sized 386.

BY STEPHEN SATCHELL, DIRECTOR OF HARDWARE TESTING

troller contributed markedly to the 386/20 sequential performance. As is common with these systems, improved sequential results trade off against reduced random access results. We rate CPU and sequential access performance excellent, and random access performance earns a rating of very good.

Software and hardware compatibility have no major problems. We put the 386/20e through its paces by running CrossTalk XVI, Desqcview 2.01; Windows 3.1, Microsoft Lotus 1-2-3, 2.01 and Microsoft Word 4.0; Sidekick Plus; Compaq's OS/2 running 1-2-3, 2.01 in the compatibility mode; OS/2 version of Rhapsody, AutoCAD 9.0, Design III Plus, and Paradox/386. We also installed a Hayes Smartmodem 2400B, Ethernet board, Token Ring board, and the Video VGA card. The only fiddling we had to do was to resolve a conflict between the two networking cards — and that isn't Compaq's fault. Hardware and software compatibility are both excellent.

With a smaller-footprint system, expandability usually suffers. To counter this, Compaq put as many functions on the system board as possible: VGA adapter, hard disk controller, floppy disk controller, serial port, parallel port, and mouse port. The system can handle up to 16 megabytes of 32-bit RAM without using a slot. This leaves all four AT-compatible 16-bit slots open for options.

Compaq elected not to provide any 8-bit XT-compatible slots, which is much less of a problem with the decline in the number of older boards whose physical design required an 8-bit-only slot.

As IBM did in the PS/2 systems, Compaq has replaced the electrical portion of the key lock with a microswitch password system; the key lock now just secures the cover. Only keyboard access is locked out. The machine will still reboot and run without the password — a convenience when using the system as a network file server.

Four mounting positions let you install up to 110 megabytes of disk capacity and a tape backup unit. We rate expandability very good; only the lack of two 8-bit slots keeps the 386/20e from

being a true 32-bit system. The 386/20e lacks the power switch and the keyboard. The only knobs are on the monitor; brightness and contrast. Everything you need is on the front of the system — no reaching around to turn the system on or off. However, if you have a lot of peripherals, you may want to use a power strip with a switch.

If you travel a lot, you'll like the fact the 386/20e will automatically detect whether the line voltage is 115 or 230 volts and will adjust itself. No more need to flip a 110/220 switch.

Ease of use earns a score of good.

DOCUMENTATION:

Documentation is supposed to tell you four things: how to set up your system, operate your system, fix your system, something breaks, and adjust or customize your system to fit your needs. *InfoWorld* insists the information be easy to read, easy to find, and easy to understand. We also feel the documentation you receive should be complete — no omissions or partial option packs.

The manuals for the 386/20e are typical of Compaq: well-written, with a comprehensive table of contents, index, and glossary — but incomplete. Installation and operation are well done, but troubleshooting is omitted and there are holes in the customization sections (nothing describing how to add or replace hard disks, tape, or the floating-point processor). On the other hand, Compaq long ago pioneered some innovations we would like more system vendors to adopt: stickers inside the system unit showing where switches and sockets can be found, concise descriptions of each switch, and the location of maintenance items such as the CMOS battery.

Compaq supplies a Help utility for MS-DOS so you don't have to use the manual every time you forget a detail of an MS-DOS command or utility.

For the developer and interested user, Compaq sells a technical reference that describes the internal workings of the computer in great detail.

Because the otherwise wonderful documentation is incomplete, we hold the documentation for documentation to very good.

SETUP:

According to Compaq, when you receive your machine from a dealer the hard disk should be completely prepared with Compaq's MS-DOS or OS/2 loaded and ready to go. This reduces setup to unpacking the system unit, monitor, and keyboard; installing any expansion boards you need; and then installing your applications software. Provided your dealer does this, we rate setup very good.

EASE OF USE:

IBM-compatible desktop systems have matured to the point where differences between them are minor. Vendors have learned what works best and doesn't, and conform to that ad-hoc standard.

The only operator controls on the 386/20e are the power switch and the keyboard. The only knobs are on the monitor; brightness and contrast. Everything you need is on the front of the system — no reaching around to turn the system on or off. However, if you have a lot of peripherals, you may want to use a power strip with a switch.

If you travel a lot, you'll like the fact the 386/20e will automatically detect whether the line voltage is 115 or 230 volts and will adjust itself. No more need to flip a 110/220 switch.

SERVICEABILITY: Compaq, like Apple and IBM, believes the dealer should service the customer. If dealers were consistently good at provid-

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ing service we would agree. Our continuing experience, however, is that dealer support varies from better than the factory to worse than a grease monkey at the corner gas station.

Ironically, judging from our inspection of the 386/20e, there should be few problems that couldn't be resolved over the phone by the vendor. The system is ruggedly built, with careful attention to the little details. To the extent that we disassembled the system, we found no cuts, jumpers, added components, or other evidence of last-minute changes. We judge workmanship excellent.

The warranty is the standard one-year guarantee. Expect a delay should you try to contact Compaq customer relations. We were told there is a five-day hold on call-in questions to encourage customers to get support through the dealer. (A company spokesman denied that this was official policy.)

Our experience is it's best to find a

Compaq owner who can recommend a dealer from personal experience. Fortunately, there are enough dealers that you are able to shop around. Because of the dealer-only support, we rate support policies poor.

Getting technical support on new Compaq products is always an interesting experience. One improvement: The dealer technical people had information about the 386/20e and could talk about the hardware intelligently. Unfortunately this didn't improve the quality of the answers we received about running popular software on the system.

We tried two dealers, asking them why our copies of Norton Utilities and Mace

**INFO
WORLD**

BENCHMARKS

Compaq 386/20e

	Compaq 386/20e	Compaq 386/20
CPU	5.4	5.4
Sequential access	3.6	1.4
Random access	2.9	3.7

Test results relative to the 6-MHz (Model 099) IBM PC AT as 1.0. Autobench CPU test measures main processor performance; hard disk performance is tested for sequential and random data access. Higher numbers indicate better performance.

SOURCE: INFOWORLD AUTOBENCH HARDWARE BENCHMARK SYSTEM 2

REPORT CARD **INFO WORLD**

PERFORMANCE COMPUTER

Compaq 386/20e

Criterion	(Weighting)	Score
Performance		
CPU speed	(75)	Excellent
Disk access		
Sequential access	(50)	Excellent
Random access	(50)	Very Good
Software compatibility	(150)	Excellent
Hardware compatibility	(125)	Excellent
Expendability	(75)	Very Good
Documentation	(50)	Very Good
Setup	(50)	Very Good
Ease of use	(50)	Good
Serviceability		
Workmanship	(50)	Excellent
Support policies	(50)	Satisfactory
Technical support	(100)	Poor
Value	(125)	Satisfactory
Final score	7.6	

PRODUCT SUMMARY

Company: Compaq Computer Corp., 20555 FM 149, Houston, TX 77269-2000; (713) 370-0670.
List Price: \$7,418 (as configured).
Features: 20-MHz, zero-wait-state 80386 CPU; one serial port; one parallel port; support for 80387 or Weltek 3167; 192-watt power supply; battery-powered clock/calendar; MS-DOS 3.31.
Peripherals: Enhanced keyboard; VGA board and color monitor.
Storage and Memory: 40-megabyte hard disk; 1.2-megabyte 5½-inch floppy; 1 megabyte of RAM.
Support: One-year warranty.
Pros: Outstanding CPU and hard disk performance for less money; excellent workmanship.
Cons: Expensive compared to other vendors; no vendor-provided technical support.
Summary: Sacrifice two slots and accept a smaller but faster hard drive and you can save \$2,000 over the standard Compaq 386/20.

One solution to three



The new IBM PS/2 Model 30 286.

BENCHMARKS **INFO**
WORLD

Compaq 386/20e

Integrated Throughput Test

Dbase III Plus	11:32
Lotus 1-2-3	1:25
Autobench 3.0	0:37
Word Perfect 5.0	1:52

Integrated Throughput Test results given in minutes:seconds; lower numbers indicate better performance.

Utilities wouldn't work on this system. One gave us the right information (this machine's disk drive is incompatible with the most common version of these analytical programs), the other didn't. The bad news is that the dealer who was right took more than half an hour to figure out the answer.

Trying to call Compaq directly, while posing as a user rather than a reviewer, we met with a stone wall: Customer relations refused to let us speak to anyone with technical knowledge and would only state that they do not support Norton Utilities.

Offsetting this somewhat is the fact that the Compaq systems are reliable, so you don't need to get them fixed very

"If you are looking for a bargain, don't look at Compaq; the company's systems are priced right at the top of the market along with IBM."

often. Once you get things working, you shouldn't run into severe problems that the dealer can't fix. We recommend, however, that you make sure *all* your software works before accepting the machine. As we found out with Norton

and Mace Utilities, if you run into a compatibility problem, Compaq won't help in troubleshooting it.

The real losers are users trying to get their systems working with their software. This is intolerable; we rate Compaq's technical support poor.

VALUE:

If you are looking for a bargain, don't look at Compaq; the company's systems are priced right at the top of the market along with IBM. But unlike IBM, Compaq's systems sell for close to list price. On the other hand, Compaq makes solid systems and, except when it runs into problems with a supplier, its systems are some of the most reliable in the business.

Compaq wants \$6,599 for the most usable configuration of the 386/20e with a 40-MB hard disk. This compares well with other name-brand computers in a similar configuration. Add a VGA color monitor (\$699) and MS-DOS 3.31 (\$120)—which brings the configuration price up to \$7,418—and you have a powerhouse system that doesn't take up much room, though it does leave a hole in your wallet. The discontinued full-sized Compaq 386/20 in its standard configuration (six slots, 60-megabyte SCSI hard disk drive instead of a 40-megabyte drive, 2 megabytes of RAM, and VGA monitor) had a hefty list price of \$9,346. With the 20e, you save \$2,000 and some desk space, sacrificing only two slots and a megabyte of RAM.

If you don't need this much power, there are far less expensive systems that will do the job. If you do need this much power, this system will serve you well, especially if you are short on desk space. We rate value satisfactory. □

of your biggest needs:

Power

Now you can get a lot more work done in a lot less time.

Not only can the new IBM Personal System/2® Model 30 286 run your DOS applications, it can run them fast. In fact, it's a system that's up to twice as fast as the popular PS/2® Model 30, thanks to its advanced technology and 286 chip.

What's more, as your needs grow, so can your system. Its power can be extended by adding up to 4Mb of memory right on the system board.

It's a high performance system without a high price tag.

Affordability

The new Model 30 286 comes with many standard features that are optional on other systems in its class. For example, dazzling VGA graphics, as well as printer, communications, and mouse ports are all built into the system, so option slots are free for other uses. You also get a performance-boosting disk cache to help "turbo-charge" some of your applications.

And, of course, you get PS/2 quality and reliability, which helps make short work of your long-term decision.

One other small feature comes standard, too. The Model 30 286 costs less than you might expect, which makes it an affordable choice for everyone.

And, since this system works with much of the software and hardware you may already have, you'll be getting the most from your IBM investment.

Compatibility

The new Model 30 286 runs most of the DOS applications you use today, like Lotus 1-2-3®, Display Write™, Microsoft® Works and dBase™. It accepts a variety of PC AT® expansion cards, and like the other entry level PS/2 models, many PC and PC XT™ cards as well.

Yet the Model 30 286 fits right in with the rest of the PS/2 family. It can communicate with the most advanced personal systems and can be configured to run IBM's OS/2™ versions 1.1.

For complete details about the Model 30 286 or any of the more advanced members of the PS/2 family, contact your IBM Authorized Dealer or IBM Marketing Representative. For a dealer near you, call 1-800-IBM-2468, ext. 101. You'll find that the new Model 30 286 is an investment that's *right for today, ready for tomorrow.*



Autobench Update Shows 80386 Power

With this issue we introduce Version 2 of the InfoWorld Autobench Hardware Benchmark System, an update designed to take into account the additional performance powers of computers based on the Intel 80386 processor.

The 80386 offers application programmers the opportunity to improve performance even within the confines of MS-DOS. Applications like Lotus 1-2-3 that were developed before the 386 became widely available don't take advantage of this potential power boost, but other applications such as Paradox 386 are coded to make better use of the 386 on-chip cache.

Autobench 2 gives a more accurate picture of the potential power of 80386-based MS-DOS computers. You'll see this power reflected in applications written to take full advantage of the 386; older applications will perform somewhat slower in CPU-intensive activities than the Autobench figures would suggest. This will be evident only in 386-based MS-DOS systems, and only in the CPU index results. Hard disk results remain unchanged.

Personal Data Pac by Tandon: Removable Hard Drives

Winchester speed and Bernoulli reliability are packaged together.

BY STEPHEN SATCHELL

DIRECTOR OF HARDWARE TESTING

Removable hard disk drives are an attractive idea. Hard drives give you capacious storage and high performance, but they are typically fixed in place; data is not easily transferred, and you're always filling them up with data. A removable hard drive makes it easy to:

- Transfer large amounts of data quickly and easily. Transmitting 10 megabytes by modem takes at least three hours at 9600 bps and a full day at 1200 bps. Removable hard disks can be copied quickly.
- Back up data at hard disk speeds.
- Secure data by locking up the disk cartridges.

- Maintain several large data files in situations where all files don't need to be accessible at once.

One approach is Syquest's removable Winchester hard disk platter, which suffers from durability problems. Another is the Bernoulli Box II, which is impervious to shock or dust but has been expensive, somewhat slower than comparable hard drives, and wears out media rapidly.

Now Tandon offers a system that combines the speed and capacity of a removable hard disk Winchester with the reliability of the Bernoulli, in a package whose base price is quite low — though the media is expensive.

FEATURES:

The Tandon Personal Data Pac removable drive subsystem consists of two pieces: the Data Pac removable media, which includes the drive mechanism and is shock-mounted inside a rugged ABS plastic shell; and the disk receptacle, which contains most of the drive's electronics. By including the drive in the removable media pack, Tandon added reliability; by splitting the electronics from the drive, Tandon reduced the cost of the removable media.

The Tandon Personal Data Pac system has a capacity of 30 megabytes and an average effective access time of 40 milliseconds, according to the vendor. Each Data Pac weighs 2.6 pounds (1.2 kilograms).

The Data Pacs were meant to be transported and Tandon went to great lengths to protect your data. The case and shock mounting are designed to protect the disk drive from the effects of an 18-inch fall onto carpeting.

In addition, when the Tandon drive parks its heads, it lifts the heads off the surface of the disk (most hard disks leave the heads sitting on the magnetic coating of the platters). Tandon claims this Winchester drive is the first to lift the heads off the media.

Tandon assigns a serial number to



Tandon Pac 286 calls for commitment to the vendor's hard disk technology.

each Data Pac and writes it to a protected portion of the disk along with a media flaw table so formatting software avoids the bad spots already identified at the factory; the user does not have to key the numbers.

The Tandon removable system comes in two forms: The first is the Ad-Pac drive subsystem, a complete package that lets you retrofit your existing desktop computer with the Tandon system. The package consists of the removable Tandon Personal Data Pac, one or more external drive receptacles, and one of three RLL controller cards: an 8-bit XT, 16-bit AT, or 16-bit PS/2 MCA. A cable connects the receptacle cabinet to the controller card. The controllers come standard with a 128K hardware disk cache buffer.

The other form is a complete Tandon desktop computer system with built-in Tandon Personal Data Pac. Possible configurations include: the 8-MHz Tandon Pac 286 or 10-MHz Tandon Pac 286 Plus, both with two receptacles; and the 20-MHz Tandon 386, with one receptacle and a 110-megabyte hard disk.

The Tandon Personal Data Pac provides high-speed data backup capabilities. With the two-receptacle system, you can make an image of one Data Pac on another.

If you have another hard disk in the system, you can use MS-DOS Copy and Xcopy commands to back up your data at hard disk speeds. Since the drives are fully sealed Winchester drives, they don't suffer from the media wear problems of the flexible-disc Bernoulli mass-storage removable drive system.

PERFORMANCE:

We evaluated both the Ad-Pac single-drive add-on subsystem and the 10-MHz Tandon Pac 286 Plus desktop computer with integral Data Pac drive.

Compared with other 8-MHz 286-based systems, the Tandon desktop held its own. The system's CPU performs respectably, with a benchmark index of 2.08. CPU performance earned a good rating.

The Tandon disk spins at 3600 rpm, the same speed as standard fixed disks. The Data Pac uses RLL recording which allows Tandon to put 24 sectors on each track instead of 17. Therefore, large sequential reads (such as those done by spreadsheets, word processors, and graphics programs) transfer data roughly 40 percent faster than a comparable drive. The drive measured 1.77 for sequential access performance and 1.28 for random performance. Comparable 10-MHz 286 systems reviewed in our July 25 comparison ranged from 1.38 to 2.31 for sequential access and 1.65 to 2.12 for random access. We rate the Tandon satisfactory in both.

When we installed the Ad-Pac system in an IBM PC AT Model 099 (an 8-MHz 286 system) the InfoWorld Automated Benchmark System measured 1.65 for sequential disk access performance and 1.05 for random access performance. The drive is slower when in the 8-MHz AT than when in the 10-MHz Tandon because of the difference in CPU speeds.

When you compare the Ad-Pac's numbers with those for the IBM-supplied drive in the same 8-MHz system (1.17 for sequential access and 1.40 for random access), the Data Pac works well in sequential access — with programs that read files straight through, such as spreadsheets, word processors, and graphics programs. (The 6-MHz IBM PC AT 099 scores 1.0 for all tests.)

We rate hard disk performance for the Tandon Ad-Pac drive subsystem satisfactory for both sequential and random access.

The Tandon 286 desktop system proved to be compatible with our standard software and hardware test suite, earning a very good score for compatibility. (Tandon does not claim OS/2 compatibility, so we didn't test for it.)

When we first received the Ad-Pac add-on subsystem, we couldn't get it to work in any system in the InfoWorld Test Lab. We called Tandon; the vendor

replaced our RLL controller board and fixed the problem. The replacement board disables zero-wait-state access for ROM calls, which some systems can't handle properly.

After we made the change, the board worked well in a variety of systems, including 25-MHz 386 systems. The Ad-Pac subsystem earns a good score for hardware compatibility. This score could have been higher if the disk worked properly with the original IBM PC AT 099 (you have to update the BIOS ROM in order to use the Tandon controller in this system).

We had little trouble expanding the desktop computer system. You can add 4 megabytes to the system without using any of the four 16-bit slots or the 8-bit slot. Although the 125-watt power supply is small by PC standards, it is more than adequate for all but the most power-hungry peripherals.

The vendor predicts a 5-megabyte system before long. The only thing left on our wish list is a second 8-bit slot. We

REPORT CARD INFO WORLD

PERFORMANCE COMPUTER

Tandon Pac 286 Plus

Criterion	(Weighting)	Score
Performance		
CPU speed	(75)	Good
Disk access		
Sequential access	(50)	Satisfactory
Random access	(50)	Satisfactory
Software compatibility	(150)	Very Good
Hardware compatibility	(125)	Very Good
Expandability	(75)	Very Good
Documentation	(50)	Very Good
Setup	(50)	Good
Ease of use	(50)	Good
Serviceability		
Workmanship	(50)	Very Good
Support policies	(50)	Satisfactory
Technical support	(100)	Good
Value	(125)	Satisfactory
Final score		6.4

PRODUCT SUMMARY

Company: Tandon Corp., 405 Science Drive, Moorepark, CA 93021; (800) 556-1234, (800) 441-2345 in CA.

List Price: \$3,199

Features: 10 MHz, one wait state, 80286 CPU; 1 serial port; 1 parallel port; 80287 coprocessor support; 125-watt power supply; LIM EMS 4.0 driver; MS-DOS 3.2; GW Basic; Microsoft Windows 2.6.

Storage and Memory: 360K floppy; dual 30-megabyte Tandon Data Pac receptacles with removable media.

Support: One-year warranty; dealer-supported service.

Pros: Very good hardware and software compatibility; very good documentation; rugged construction.

Caveats: Slightly more expensive than other 80286 systems.

Summary: An 80286 system designed to take advantage of Tandon's removable hard disk technology.

score expandability very good.

DOCUMENTATION:

The manuals provided with the Tandon Pac 286 and the Ad-Pac subsystem are among the best we've seen. The documentation did exactly what it was intended to do: tell you how to install, use, customize, and fix the product.

The manual for the Tandon Pac 286 contains everything you need to know to install and use the system. The troubleshooting section is complete and very useful. We liked its clear writing style and the comprehensive index and table of contents. We rate it very good.

The two manuals that come with the Tandon Ad-Pac subsystem are deceptively thin. They are very comprehensive. The installation section uses many pictures to make the process clear and almost foolproof. The description of how to use the Data Pacs with the drive is clear. Like the Tandon Pac 286 manual, it has a complete and useful troubleshooting section, index, and table of contents. It is significantly better than the documentation we have seen for most other disk drive subsystems. We rate documentation for the Ad-Pac subsystem excellent.

SETUP:

Setting up the Ad-Pac subsystem is easy if you follow the instructions in the manual. You plug in the controller board, connect the receptacle to the board using the cable

supplied, and install the software driver. We were disappointed that Tandon didn't provide a program to automate this step; you have to edit your Config.sys file yourself, but the line you add is simple and well-documented. The Ad-Pac subsystem setup rates a very good.

Setting up the Tandon Pac 286 desktop is just a matter of unpacking everything, plugging it together and starting the MS-DOS in the Data Pacs provided with the Pac 286.

The 1.2-megabyte Floppy drive is not connected to the system, but connecting it is a breeze. You use clips to hold the drive in place instead of screws. Setup for the Pac 286 is rated good.

EASE OF USE:

The Data Pacs are simple to use. With system power on, you insert the Data Pac into the empty receptacle until the drive captures it and pulls it home. The drive then starts up automatically. When you command the system to eject the drive, the Data Pac spins down, parks and lifts the heads, and pushes the drive so you can pull it out the rest of the way. Unlike other disk systems that insist you push the disk in all the way, the Personal Data Pac completes the connection between the drive and the receptacle for you.

You can define a hot key from the keyboard, use the initial start screen, or run a supplied utility program to eject your Data Pacs. However, there is no way to remove a disk without power; Tandon says this is a security feature that prevents someone from removing a Data Pac.

The Pac 286 system is a minitower that can sit on your desk. The power switch is on the front, and the reset switch is well protected.

The Ad-Pac drive and Tandon Pac 286 both rate good for ease of use.

SERVICEABILITY:

We wanted to find out just how rugged the Personal Data Pac is, so we shipped Data Pacs around the country by UPS. We also put a Data Pac in checked luggage for a transcontinental trip and dropped them on the floor a few times. Despite this punishment, we didn't experience any jolt-related failures. We also had no trouble trading Data Pacs among several drives in different locations.

Tandon had to replace one unusable Data Pac; ironically, it was not one of the tortured Data Pacs. The bad Data Pac failed very early in our testing; we judged this to be a sample defect.

A Personal Data Pac is a simple device: a sealed chamber with a drive motor and head and a small printed circuit board with some of the drive's electronics. The receptacle holds the remainder of the electronics circuitry. The design and workmanship were as clean as we expect from disk vendors.

We found it very difficult to take the Tandon Ad-Pac drive receptacle apart, but it was well worth the work. The single-printed circuit board uses surface-mount components. The board sits between parts since the board doesn't have to fit inside the confined space of the drive itself. The revision H board had a handful of wires and three components (transistor, resistor, and capacitor) tacked onto the board. This should have little impact on the reliability of the receptacle — the workmanship on the changes is superb.

The Tandon Pac 286 showed no last-minute changes and was ruggedly built. We've come to expect this from the current generation of 286 systems. Both products earn a very good for workmanship.

Both the Tandon Pac 286 and the Tandon Ad-Pac subsystem carry one-year warranties. The Personal Data Pacs carry this warranty for the same period as well. Support is supplied by your dealer, although we were able to get help directly from Tandon. We score support policies satisfactory.

Technical support varies for the two products. Fewer things can go wrong with a disk subsystem than with a complete 286 system. Support for the Tandon Pac 286 system was good, with the technicians giving us quick, accurate answers to our questions. We rate technical support quality for the desktop unit good.

We had real trouble with the Ad-Pac subsystem, which gave the technical support staff a chance to show what they could do. The board wouldn't work in a number of systems. Repeated calls elicited a "try this, try that, did you try so-and-so" from the technicians. Several days later Tandon called our editors and said the RLL controller board had to be changed. The change enabled the Ad-Pac drive to work with everything except the original IBM PC AT 099.

The support technicians demonstrated a strong knowledge of the product when they tried to help us make it work. We rate technical support on the Ad-Pac original IBM PC AT 099.

subsystem very good.

VALUE:

The 10-MHz Tandon Pac 286 Plus with a two-drive Personal Data Pac subsystem lists at \$1,931. Remember to add two 30-megabyte Data Pacs, which raises the cost to \$3,997, a monitor, and a disk adapter. The result is a bit expensive for a 10-MHz system, though it compares well with name-brand systems like the AST Premium/286. We rate the Tandon Pac 286 a satisfactory value.

The single-drive Tandon Ad-Pac subsystem is more of a bargain at \$599, plus \$399 for a removable 30-megabyte Data Pac. In short, your first 30 megarbytes cost you just under \$1,000. This compares to its most direct competition, the Bernoulli Box II, which for \$1,100 offers an internal 20-megabyte drive (\$2,350 for a pair of 20 megabyte platters). (See product comparison September 5, 1988, and also review November 5, 1987.) Tandon's media cost is higher, at \$399 per Data Pac compared to Bernoulli cartridges at \$83, but Bernoulli cartridges wear out quickly, requiring frequent replacement. Tandon offers more durable media, somewhat higher performance, and higher storage capacity. We rate the Tandon Ad-Pac a very good value. □

Form Easy's Capabilities, Simplicity Make It Stand Out

Forms creation, editing package gains value from database, Lotus graphics file merging.

BY ALBERT MAY REVIEW BOARD

Form Easy, published by Graphics Development International, is intended for those in a forms-intensive environment, i.e., for those who design, manage (or edit), and fill in forms of every kind.

Since many users will want to complete forms from existing data sources, the program has the flexibility to import files from various word processors, databases, and spreadsheets. You can also import graphics files from Lotus and PC Paintbrush, as well as use Form Easy's scanning module to bring in images and do simple editing. As a result, Form Easy allows creation of data-entry screens that interface with various database files, and printing of forms with or without data on several popular laser and dot-matrix printers. The program is especially useful for designing copyable or camera-ready blank forms.

FEATURES:

Form Easy, Version 3.0B contains four disks and an instruction manual. Also included are 17 sample forms along with eight sample source documents for the user to be used with the various forms. The software and manual contain a tutorial that opens with the start-up of Form Easy and continues through each of the functions. A macro capability allows the user to embed a command to print a database query onto a form in a batch procedure. This enables the merging of data onto forms directly from DOS or from any database, edited when necessary, and printed on the selected printer.

Form Easy requires 512K of memory, DOS 2.0 or later, and a hard disk for the full version. A run-time version can operate on floppy. Color graphics capability is another significant enhancement

to earlier versions. Although it is primarily designed for use with laser printers to take advantage of varying fonts, a dot-matrix printer with graphics capability also works. We viewed output on both an HP laser printer and a nine-pin Epson dot-matrix printer.

Form Easy is available in a run-time version (\$295) for users once forms and relational database files have been defined. The run-time version allows the user to access any saved form, enter the information, and print it; but it does not allow modification or creation of forms or databases.

PERFORMANCE:

Form Easy has five operations that can be selected from the main menu: editing a form, filling a form, merging information onto a form, changing printer selection, and exiting to the operating system.

Selection of the edit function allows modification to any of the existing forms, as well as creation of new forms of any type. This option gives the user access to the word processing and form design functions in the package. A significant library of forms can be stored and reused with a minimum of effort.

With the fill option, the form fill option, a form is selected from the library and displayed on the screen. Users can then type data onto the form and print it. The merge option enables the user to merge an existing form with a data file, thus allowing a series of forms to be printed with the data from the file.

To provide quick access to information about the form, a command line appears at the top of each screen with a status line at the bottom. The compiled forms are stored in the printer, eliminating the necessity to download them each time they are used in any application.

A note in the manual states it was

REPORT CARD

INFO WORLD

REMOVABLE HARD DISK

Tandon

Personal Data Pac

Criteria	(Weighting)	Score
Performance		
Sequential access (100)	Satisfactory	
Random access (100)	Satisfactory	
Hardware compatibility	(100)	Good
Documentation	(75)	Excellent
Setup	(125)	Very Good
Ease of use	(50)	Good
Serviceability		
Workmanship	(100)	Very Good
Support policies	(50)	Satisfactory
Technical support	(50)	Good
Value	(250)	Very Good
Final score	6.8	

PRODUCT SUMMARY

Company: Tandon Corp., 405 Science Drive, Moorepark, CA 93021; (800) 556-1234, (800) 441-2345 in CA.

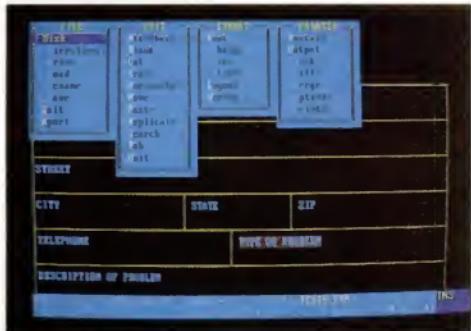
List Price: \$599 (Ad-Pac); \$399 (Personal Data Pac).

Requires: IBM AT or compatible; MS-DOS 3.0.

Pros: Very rugged removable hard disk storage; performance comparable to fixed hard disks; excellent documentation.

Cons: High cost of media; can't remove media if power is off.

Summary: High in media reliability, with respectable performance, the Tandon Ad-Pac is a good hard disk system that only charges a modest increment for the bonus of removability.



Form Easy's menus are always available and access all program features.

created, edited, and printed using Form Easy and a laser printer, with the program's word processing capabilities. Form Easy flawlessly performed as advertised and as stated in the user manual. Its capabilities, especially to easily create lines and boxes, place its performance in the top class. We find its performance very good.

DOCUMENTATION:

Form Easy's documentation comes in a hardcover book with four 5 1/4-inch diskettes. It offers a basic table of contents and index. The first appendix in the manual is a 10-page quick-reference guide for the various keys and commands used with this software. On-line help screens are available throughout the program, and we found them easy to

access and understand. The user manual is clearly written in a non-technical vocabulary and is very easy to read.

Since this package makes use of the many capabilities of the various laser printers, there are several sections in the documentation devoted to these printers and their particular requirements. The manual discusses dot-matrix printers as a single class.

Part I of the user manual explains each of the functions of Form Easy. Part II contains the commands and function keys. The 26-page tutorial contains nine lessons and two examinations to be completed and then finishes with a "final examination." Each lesson has as "required reading" the appropriate section of the user manual. Each examination uses a form or source document and is designed to provide a practical application to reinforce the procedures that were explained.

The only thing preventing a higher score is that the manual looks like it's straight out of a laser printer, with few graphics or highlights for key features. We rate documentation good.

EASE OF LEARNING:

Any user, regardless of experience with forms software, must have a reasonable understanding of the laser printer and its fonts. A user who is not experienced with forms design will not doubt take longer to become familiar with the various aspects of layout than one who has constructed forms previously.

The actual installation is accomplished by one command and a response to several prompts. We took about 20 minutes to get going, and novices should be running within an hour. The tutorial takes another two hours. Because of the capability for inexperienced users to make rapid use of the package, we find ease of learning very good.

EASE OF USE:

The excellent use of menus and function keys throughout Form Easy offers a very responsive package. As we grew more familiar with the package, the use of the function keys, as well as the alt-key combinations, enabled us to rapidly complete our work.

The package can easily fill and merge forms if the data files either exist and are easily accessible or can be constructed by the user. Another bonus is the capability to place text and then create a box around it afterward. In some packages you must select your boxes and lines first and then make the text fit inside of

them.

Because this is one of the easiest software packages on the market in which to construct and complete forms, we rate it very good in ease of use.

ERROR HANDLING:

This software package has minimal error-handling capabilities. After creating a form, for example, you can designate each field as alphabetic or numeric and specify the minimum and maximum values. There are several standard error messages, including Change Cartridge, Copy Proper Table, Not Enough Memory, File Doesn't Exist, and No Printer. The run-time version operates as a security module and does not allow edits or changes.

Form Easy won't tell you, however, if your printer choice is incorrect. If your printer fails to work or you get garbage on the page, your resources are either to turn the power off and on or to reselect the printer.

If you lose power or crash, you'll lose your work since the last save, but you can't damage your source data files. It is possible to edit your database files from Form Easy, but only by saving the data. That preserves data integrity. The program prompts you to save your work when you quit.

Fortunately, there's not much to go wrong here; we find the error-handling capabilities of Form Easy satisfactory.

SUPPORT:

The vendor offers a 90-day warranty that guarantees the software will operate as described in its manual and advertising. There is an extended support program for corporate customers. Buyers get free updates for 90 days after purchase. Support hours are Monday through Friday from 8:30 a.m. to 5 p.m. Pacific time. The technical support section does not have a toll-free number. We rate support policies good.

We made several calls to the Form Easy support services and just once had to leave a message, which was returned within 30 minutes. In each case the technical support staff rapidly provided an accurate answer. The technicians appeared to have a fine knowledge of the product and were able to provide helpful hints for solving the problems. We rate technical support good.

VALUE:

Creating new forms or customizing those provided in Form Easy requires some knowledge of forms construction and use, but this program's simplicity allows the user to standardize both procedures and written presentation of information throughout a company. This product will help users prepare finished forms for reproduction, as well as merge database files to print out completed forms. The capability to incorporate Lotus graphics and files from various word processors into a single document further increases the value of this package to the average business.

Form Easy costs \$495 and is a fine addition for those who create, manage, and complete forms, as well as for those who incorporate graphics and text from various sources into a single document. For those who create and process a number of forms in-house, the program will probably save them a lot of money. We rate it very good quality.

Albert May is a former chief operating officer for a national employment tax company. He has been involved with personal computers in business since 1975.



The Mach 20 upgrades a PC or XT CPU to an Intel 80286 running at 8 MHz.

With Mach 20 PCs, XT's Can Now Run OS/2

Accelerator board has options but not speed.

BY GREG SMITH
INFOWORLD TEST CENTER

For PC or XT owners determined to run OS/2 on their present machines, the Microsoft Mach 20 accelerator board provides a solution: a complete package that gives you 80286 power, all the memory you'll need; a mouse port; a floppy controller for never, higher-capacity floppy drives; and, of course, OS/2 compatibility. And all this fits on one card so that if you replace your current floppy controller, you end up with the same number of available slots in your computer.

Offsetting these nice features is the fact that Microsoft's Mach 20 accelerator board isn't terrifically fast.

FEATURES:
The Mach 20 upgrades a PC or XT CPU to an Intel 80286 running at 8 MHz. Microsoft also includes an on-board slot for an optional 80287 math coprocessor. To minimize cost, Microsoft designed the Mach 20 to rely on the host computer's memory. The board's 80286 chip was designed for a 16-bit data bus, but because pre-AT machines were designed around an 8-bit bus, accessing the motherboard's memory can choke performance. To reduce delays while fetching information, 16K of zero-wait-state memory (on the board's internal 16-bit bus) is included for caching.

A Microsoft Import controller is integrated into the basic Mach 20 board, which allows an Import mouse to be plugged directly into the basic card — sparing a serial port.

Microsoft also offers a Disk Plus option board that supports, in addition to the standard PC or XT 3½-inch 360K floppy drive, a higher-capacity AT-style 1.2-megabyte drive as well as 3½-inch 720K or 1.44-megabyte PS/2-style floppy drives. Because this board also plugs directly into the Mach 20, it frees the slot currently occupied by your floppy controller.

For users contemplating a move to OS/2, Microsoft offers a version of its Standard Edition OS/2 customized for the Mach 20, which sells for \$325. Like other implementations of Microsoft's OS/2, this one offers a dual-boot feature that allows users to install OS/2 in addition to their current version of DOS.

PERFORMANCE:
The Mach 20 boosts an XT's CPU speed and functionality to match that of an 8-

REPORT CARD

INFO WORLD

FORMS SOFTWARE

Form Easy

VERSION 3.0B

Criterion	(Weighting)	Score
Performance	(400)	Very Good
Documentation	(80)	Good
Ease of learning	(40)	Very Good
Ease of use	(120)	Very Good
Error handling	(80)	Satisfactory
Support		
Support policies	(40)	Good
Technical support	(40)	Good
Value	(200)	Very Good
Final score	7.1	

PRODUCT SUMMARY

Company: Graphics Development International Inc., 20-C Pimentel Court, Suite 4, Novato, CA 94949; (415) 382-6600.
List Price: \$495.
Requires: IBM PC, XT, AT; 512K of RAM; DOS 2.0 or later; hard disk.
Pros: Easy-to-use menus; good tutorial; good tech support; useful word processing functions.
Cons: Limited error handling; manual could benefit from graphics.
Summary: Ideal for forms-intensive companies doing lots of in-house work.

MHz IBM AT (Model 339). On the *InfoWorld* Hardware Benchmark System, this board scored a 1.42 in CPU performance—comparable to the IBM AT that scored 1.37.

The Mach 20 did not do much for the XT's poor hard disk performance; it scored a 0.59 on the sequential hard disk test and 0.96 on the random hard disk test—almost exactly the same as the standard XT's scores and significantly lower than the IBM AT's scores of 1.17 and 1.40 respectively.

If users purchase the Microsoft Memory Plus board, however, they can dedicate a portion of its memory for Smartdrive, a disk-caching package. Because many of the *InfoWorld* throughput tests involve at least file loading and saving, most of the Mach 20's scores were low compared to an equivalent AT. The Word Processing/Desktop Publishing model fared the best with a less-than-average 7.00; an IBM AT running the same test scored 5.38.

Similarly, this board's spreadsheet score of 11.25 vs. the AT at 6.71, and CAD score of 8.42 vs. 6.36 for the AT were slow. Even worse, the score of 34:21 in the database test sagged in comparison to the AT's score of 18:19. The vendor claims hard disk throughput can be

improved with the use of the optional Memory Plus board. For the basic system, however, we rate the Mach 20's speed satisfactory on the basis that the accelerator doesn't tax an XT the CPU performance of an AT.

The Mach 20 breezed through our software compatibility suite. To test DOS software compatibility, we ran Crostak XVI, Version 3.61; Desqview 2.0; Paradox 2; Word 4.0 (in graphics mode); Sidekick Plus; and Windows, Version 2.03.

For OS/2 compatibility, we ran Rbase for OS/2, as well as Lotus 1-2-3 in the DOS compatibility box using Microsoft's OS/2 for the Mach 20. But we were unable to get the Vega VGA card to work in our compatibility box. This appears to be an incompatibility between certain revisions of the Vega card and OS/2's compatibility box, rather than a problem with the Mach 20 board.

To accommodate speed-sensitive software, the Mach 20 can be toggled with a user-definable key combination to run at 4.77 MHz. In the absence of any problems, we rate the Mach 20's software compatibility very good.

Likewise, the Mach 20 successfully ran with the ATI 2400 internal modem, AST Premium EMS, Video Seven Autoswitch VGA, Plus Development Hard Card 40, 3Com Etherlink II, and IBM Token Ring cards. This problem-free performance earns the Mach 20 a very good in hardware compatibility.

The Memory Plus option board can accommodate up to 3.5 megabytes of additional memory. The Mach 20 can access this memory quickly, thanks to the Mach 20's internal 16-bit bus, which the Memory Plus board connects directly into. This additional memory can be used to backfill systems with less than 640K of conventional RAM, as extended or LIM 4.0 expanded memory. (With 512K of RAM, the Memory Plus board costs \$495.)

The versatility and capacity of Microsoft's Memory Plus board scores a very good in expandability.

The integration of the floppy controller, mouse port, memory, and accelerator card, as well as the effective memory cache earn this enhancement system a one-half point for design merit.

DOCUMENTATION:

The Mach 20 documentation is short but complete. The user's guide included a nice table of contents and index; a quick-start guide for those familiar with the installation of expansion cards; and a step-by-step guide for novices that takes the reader through opening the case,

removing the processor, installing the card, and closing the case. In the booklet there are listings in two locations for the location and purpose of each jumper on the board. For Compaq portable owners, Microsoft includes a special appendix describing installation in the Compaq's box.

The installation guides for the option boards are scant but adequate. Both supplements give a brief, illustrated discussion of how to mount the option cards onto the Mach 20. The clear writing plus substantial aides earns a very good score for documentation.

SETUP:

The on-line installation guide made it simple to set the numerous jumpers by showing users the best jumper settings for their machines. The detailed illustrations and special tool for prying out the 8088 ensure that even a novice will succeed. With a setup time of less than 15 minutes, the Mach 20 earned a very good score in setup.

EASE OF USE:

Like most add-in boards, once installed there isn't much to using an accelerator board. Memory caching can be controlled with a command-line utility and CPU speed is easily selected. This board rates good for ease of use.

SERVICEABILITY:

The Mach 20 board and its add-ons are well-designed. We were concerned about a possible grounding problem at the end of the ribbon cable, and some of the memory chips were improperly inserted. Minor defects offset benefits to limit the Mach 20's workmanship score to good.

Microsoft warrants the Mach 20 for two years. All needed repairs are made through Microsoft's repair center. Technical support is free and unlimited, but you'll have to pay for the long-distance call. We rate Microsoft's support policies good.

Technical support was accurate and easy to get. It rates a good.

VALUE:

The Mach 20 is a bit expensive at \$495 for the basic board. Similarly rated accelerator boards are available for as little as \$269.

With its option boards, however, the Mach 20 can provide more features than many competitors. Its OS/2-compatible design, rare among accelerator cards, offers an advantage to XT or PC users wanting an upgrade to OS/2. Overall, we rate the Microsoft Mach 20 a satisfactory value.

REPORT CARD

INFO WORLD

ACCELERATOR BOARD

Microsoft Mach 20

Criteria	(Weighting)	Score
Performance		
Speed	(125)	Satisfactory
Software compatibility	(150)	Very Good
Hardware compatibility	(150)	Very Good
Expandability	(75)	Very Good
Documentation	(75)	Very Good
Setup	(50)	Very Good
Ease of use	(150)	Good
Serviceability		
Workmanship	(30)	Good
Support policies	(20)	Good
Technical support	(75)	Good
Value	(100)	Satisfactory
Bonus (design merit)	.5	
Final score	7.0	

PRODUCT SUMMARY

Company: Microsoft Corp., 16011 N.E. 36th Way, Redmond, WA 98073; (206) 882-8090.

List Price: \$495.

Features: For PC and XT compatibilities; 8MHz-286 CPU; socket for 80287; optional card for up to 3.5 megabytes of 16-bit memory and for high capacity floppy controller.

Pros: Easy to install; integrates floppy controller, memory, mouse port, and accelerator into one card; OS/2 compatible.

Cons: Relatively slow and expensive compared to other accelerator cards.

Summary: An expensive accelerator card that upgrades your XT to AT performance (but no higher), the Mach 20 is of most interest to those who demand OS/2 compatibility.

BENCHMARKS

INFO WORLD

Accelerator Boards

	Mach 20 ¹ (8 MHz)	IBM XT (4.77 MHz)	IBM AT (339) (8 MHz)
Ambrebench scores:			
CPU	1.42	0.34	1.37
Hard disk sequential	0.59	0.55	1.17
Hard disk random	0.96	0.98	1.40
Throughput scores:			
CAD	8.42	24.59	6.38
Database	34:21	60:26	18:19
Spreadsheet	11:25	24:26	6:71
Word processing/ Desktop publishing	7:00	19:51	5:38

¹Installed in an IBM XT.

InfoWorld Guide to Reviews

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Products receive ratings ranging from unacceptable to excellent in various categories. Scores are derived by multiplying the weighting (in parentheses) of each criterion by its rating, where:

Excellent = 1.0 — Outstanding in all areas.

Very Good = 0.75 — Meets essential criteria and offers significant advantages.

Good = 0.625 — Meets essential criteria and includes some special features.

Satisfactory = 0.5 — Meets essential criteria.

Poor = 0.25 — Fails short in essential areas.

Unacceptable or N/A = 0.0 — Fails to meet minimum standards or lacks this feature.

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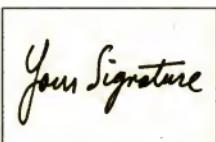


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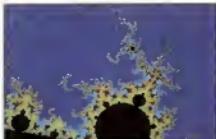
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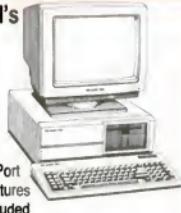
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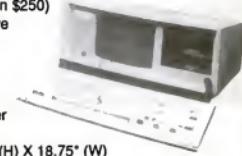


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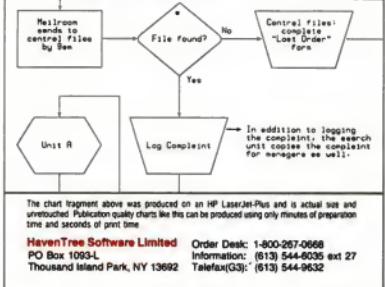
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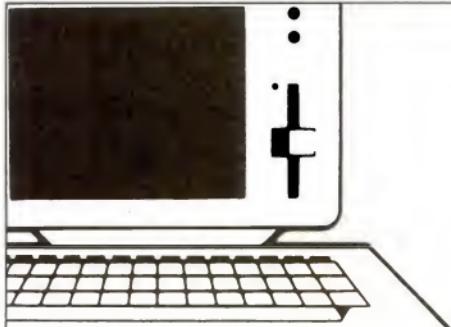
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Microsoft Word, Version 5.0 Unveiled

By PEGGY WATT

An updated Microsoft Word, with enhanced redlining and OS/2 protected-mode support, was unveiled last week.

Word 5.0, scheduled to ship by the end of the year, also now displays graphics in a full-page Print Preview mode, said Ruth Kurman, Microsoft Word product manager. Users can edit and move images and columns of text, add borders and shading, and flow text and graphics in a new Show Layout mode.

Links to source data that automatically update charts and graphs in Word documents, now

accept database files as well as spreadsheets. Workgroup editors can now add names, dates, and times to comments, Kurman said. "You can split a document into two windows, with one for comments, and later merge all comments into one file," she said.

New "bookmarks" let users name and link document sections. Also added are an auto-save option, automatic re-pagination, and EMS 4.0 support. Column and tab justification can be automatic or user-defined, and adjusts spaces for fonts.

The major ease-of-use

change is in designing tabs and tables, where the feedback was loud and clear," Kurman said.

Word 5.0 has network support so users need only add \$195 Node Packs for each workstation. It retains the \$45 price of the one-year-old Word 4.0, with \$75 upgrades for users of any previous releases.

Word 5.0 runs on PC and PS/2 compatibles with 512K of RAM and DOS 2.0 or later, and supports bus but does not require a monitor.

Microsoft Corp., 1601 N.E.

36th Way, Box 97017, Redmond, WA 98073-9717; (206)

882-8080.

using the mouse.

One great innovation is a new tree outlining feature. When this is turned on, you can collapse and expand your list of directories by clicking on a minus icon in front of the directory name to collapse and a plus icon to expand. This lets you control the level of detail you see and is helpful if you have disk partitions with a large number of subdirectories.

A few functions from DOS 4.0 seem to be missing, however. It doesn't offer password protection for individual programs, nor does it have a file-viewing facility.

TRAINING SYSTEM. Presentation Manager also comes with a computer-based training system that teaches you how to use it; and the individual elements (Task Manager, Start Programs Window, and File System) all have extremely useful help files.

The user interface follows IBM's Systems Application Architecture. As in DOS 4.0, you access menus with the mouse or by using F10 or Alt to activate the menu bar. Unlike Windows, you can't hold down the Alt key while typing a menu letter.

INSTALLATION. Installing OS/2 1.1 over existing versions of OS/2 is relatively straightforward, though it requires a fair number of disks.

You can install OS/2 into your existing DOS or OS/2 1.0 directory structure, or you can repartition your disk (backing up first). Unlike OS/2 1.0, it lets you use a single large directory, rather than limiting you to 8.3 megabytes, so you may want to repartition your disk. OS/2 1.1 and the various utilities that come with it take up about 8.2 megabytes of disk space.

The operating environment sets up a default configuration, which you can then view, change, or simply accept. Most users should probably accept the defaults, but if you need to change them, you only need to fill in a configuration screen.

This controls such options as the number of buffers, the size of the disk cache, the number of threads the environment will support, the enabling of various memory management features, and setting up the DOS "compatibility box" (which takes some memory). These settings let OS/2 manage program priority dynamically and set how many seconds an application should wait before receiving a higher priority.

OS/2 1.1 requires a 286- or 386-based machine with at least 2.5 megabytes of free RAM (if you want to run DOS as well as OS/2) and will cost \$340. IBM will offer free upgrades to users of OS/2 1.0, and other vendors are expected to follow.

technical innovation still remains a high priority.

"We seek not the lowest common denominator that will limit the future to today's constraints, but the highest possible denominator that will balance compatibility needs against new features that will benefit us all," the statement read.

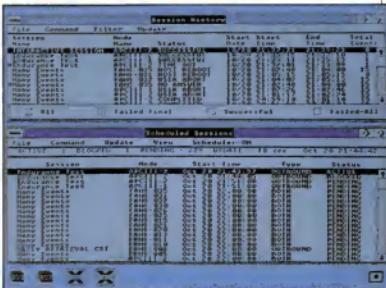
According to Intel, the 486 chip will maintain the same basic architecture as the 386 chip but will perform at much higher speeds. (See "Intel to Follow 386SX With Faster Chips," June 27.) Intel has said it will ship the 486 in volume in 1989.

CONFICTING ANNOUNCEMENTS. The events that triggered the

group's formation occurred six weeks ago when PC buyers were hit with a triple whammy of conflicting announcements. Within one 24-hour period, the Extended Industry Standard Architecture (also known as the "Gang of Four" coalition) announced a 32-bit interface to IBM's controversial Micro Channel Architecture (MCA). IBM appeared to be going back to the future by introducing two new machines using the "classic" AT bus, and Apple raised prices of its Macintosh systems 15 to 30 percent across the board. (See "Winds of Change Spawn Storm of Controversy: Industry Ferrments Forces Many PC Buyers Into Holding Pattern," September 19.)

One disturbing trend PC professionals see is that with the EISA specifications, memory cards will not be standardized. Instead, each PC vendor designing to EISA specifications will design its own property memory cards. (See related story, Page 1.)

But what troubles the group even more is that I/O slots in 486 systems will also follow this trend.



Xcelenet's graphics-based system that uses Presentation Manager employs the "point and shoot" method of configuring.

Look

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could set up menus for other users; however, DOS programs must be run from the command prompt. Applications written specifically for the Presentation Manager and most OS/2 1.0 applications can be run within windows on the main screen, while DOS and its applications always run in full-screen windows. You move among windows by using Alt-Tab or Alt-Esc; or you type Control-Esc to return to the Task Manager.

FILE SYSTEM. Presentation Manager's file system looks similar to the DOS 4.0 shell but adds some new features. The file system displays the directories within a disk or partition in a tree structure and lets you view all the files in the subdirectory in a list fashion. Within these windows, it displays an icon indicating the type of program. It optionally can show a full directory including size, dates, times, and attributes such as whether the file is a read-only, archive, hidden, or system file.

Presentation Manager's file system has several features that are somewhat surprising. As on a Macintosh, you can now select a file or a group of files and drag them into another directory,

you can install OS/2 into your existing DOS or OS/2 1.0 directory structure, or you can repartition your disk (backing up first). Unlike OS/2 1.0, it lets you use a single large directory, rather than limiting you to 8.3 megabytes, so you may want to repartition your disk. OS/2 1.1 and the various utilities that come with it take up about 8.2 megabytes of disk space.

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PM

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using the mouse. Pop-up and pull-down menus, as well as dialog boxes, also simplify the process of setting up and managing hundreds of remote nodes.

The "point and shoot" method of configuring each part of the network system simplifies and speeds up operator training and setup time, said Dennis Crumpler, Xcelenet's president. The system is being tested in several pilot sites, including large retail chains. More pilot sites are planned before the commercial release of the program, which is expected early in the second quarter of 1989.

Borland is also expected to demonstrate a Presentation Manager program, which sources said would ship later this quarter.

INCOMPLETE ENVIRONMENT. While IBM and Microsoft are stressing they have met their goal, programmers report that the development environment is not yet complete.

"Basically, there is no printer support," said Ken Whittaker, vice president of research and development at Software Publishing. In addition, drivers for monitors are not ready, he said.

IBM has developed drivers for its Proprietary and displays,

such as the 8514, but other vendors will have to develop device drivers for non-IBM hardware, according to George Grayson, president of Micrograft. That process could take as long as a year, he added.

Some developers are also frustrated with the quality of the Software Developers' Kit, saying that they need both a clean operating system and a clean set of tools.

"Even if we have a production copy of Presentation Manager, there are still a few problems," said Terry Zimmerman, vice president of marketing for Personal CAD. Because both the code and documentation are incomplete, tracing where problems occur and solving them can take more time, he added.

"We just have to be as patient as we can with getting the solution," Zimmerman said.

SPEED ISSUES. Presentation Manager's speed is another issue the developers hope Microsoft will work on. "The speed had better be taken care of," said Software Publishing's Whittaker. "Presentation Manager running in protected mode still leaves a lot to be desired," he added.

But other developers are philosophical, saying that performance issues are relative, and much of Presentation Manager is as clean as is possible.

"You have a lot of power [under Presentation Manager] because a lot of the housekeeping you had to deal with under earlier windowing systems, which were limited with the lack of memory, goes away," said Bob Frankston, chief scientist at Lotus.

FUTURE APPLICATIONS. Still, most publishers say it will take quite some time for Presentation Manager's applications to come to market. Although a few early adopters will have products available in late 1988 and early 1989, most companies won't ship Presentation Manager programs until at least the second half of 1989.

"Next summer will be a fun time," Frankston said.

— Robert Snowden Jones also contributed to this report.

486

Continued From Page 1

"Stories abound of vendors with imaginative but incompatible products that fell by the wayside," the statement read. "The lesson should be clear: Progressive PC standards create better ease of use for end-users and greater standards while building superior reliability and service into their products."

USER GUIDANCE. Users are the ones who must guide vendors into setting adequate standards, according to the committee, which cautioned, however, that



NOTES FROM THE FIELD • By ROBERT X. CRINGELY

Presentation Manager Tricks Haunt Microsoft

Californians are into Halloween. Maybe it's the proximity of Hollywood, but adults here love to dress in costumes, and ever since the court made me start wearing something under my raincoat, so do I. This year, I'm going to parties as a Hell's Angel, which is not only a cheap costume to put together but also helps me get parking places.

It's a simple costume, though the tattoo hurt a bit. The part I don't

understand is the chain that bikers use to connect themselves to their oversize leather wallets. Are the Hell's Angels plagued by pickpockets? InfoWorld readers who are motorcycle gang members, please give me a call on this one.

ENTERTAINMENT'S REWARD. Leaving the house to pick up Pammy, I met a dozen 7-year-old robots accompanied by a tired-looking father assigned to protect them

from razor blades and cyanide Snickers. "Trick-or-treat! We only take money," they squealed in unison.

"Give me the trick," I said.

On this mindless repetition theme, how many different versions of Presentation Manager do we need? PM for OS/2 ships today, despite continued problems with spoofing graphics. HP is announcing a PM version for Unix tomorrow.

For its Unix, IBM has chosen the Next interface for AIX rather than PM. And don't forget Metaphor — which is the real interface for OS/2 EE, to be made SAA-compliant through the simple method of changing the SAA standard, as Big Blue is occasionally wont to do.

This leaves Microsoft out in the cold. And Redmond cutting a deal with HP for PM on Unix isn't making Microsoft very popular at IBM.

RESTRAINT IS THE POLITICAL PART OF VALOR. There's a sense of power that comes with having people fear you. Driving to Pammy's house, looking like an extra from *The Wild One*, I slipped deeper into my biker role. When I stopped by the 7-Eleven and found the Slurpee machine out of order, I wanted to "bust heads."

But heads remained unbusted, and I had a Diet Coke instead. The chant around Washington is that similar restraint was applied to the Air Force multi-user Unix contract award announcement, originally scheduled for this week. The announcement of one of the largest computer contracts in government history was delayed until after the election, I'm told, so that Dukakis couldn't point to it as wasteful spending.

The folks at Plus Development are also showing some restraint in refusing to tell me about their upcoming Impulse announcement. But I hear the product, code-named BMR, is a drive array using Prodrite AT drives (probably for LANs) that allows the system to handle multiple physical hard disks as a single logical drive. Could this mean the product might also be developed for use in Passport removable drives?

THIS IS WHAT BOBS GET PAID FOR. Tonight's Halloween party was at the home of a sometime friend, who also happens to be an industry big shot. "Come to the party and have a good time, Bob," he told me early this week. "But there are some topics I want you to stay away from."

"Don't mention that the DBase IV version shipping today will go out with documentation printed in June that no longer matches features of the program. Don't mention that Symantec will have Q&A for the Mac at Macworld in January. Don't mention that Stone & Schuster Software is essentially out of business. And don't ask why IBM's changing \$340 for OS/2 when it said it would cost \$325 when it was announced last year."

"Anything else you don't want me to ask about?" I wondered.

"Yes, don't ask my wife to dance."

Arriving finally at Pammy's house, she came to the door, a vision in black leather and spiked heels, the perfect biker's woman. "Bobby," she squealed happily, taking the chain from my wallet. "You brought me a necklace!"

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